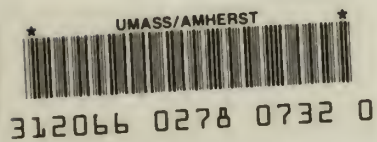


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MBTA Fares

An Analysis of Current Policy and Practice



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MBTA FARES

An Analysis of Current Policy and Practice

MBTA ADVISORY BOARD STAFF REPORT

January, 1989

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Preface

This monograph, the third in the four volume series Future MBTA Service and Funding Alternatives, was prepared by Carol Wallace, formerly of the MBTA Advisory Board staff. Portions of the material were contributed by Robert Blake and final review and preparation were completed by Maryann Foley, both of the Advisory Board staff.

The study series was funded by a grant from the Urban Mass Transportation Administration of the U.S. Department of Transportation. The alternatives presented in the four volumes will be reviewed by a public panel whose purpose will be to recommend changes in how the T is financed and/or how communities are assessed for T services.

The four volumes in the series were prepared during 1986-1988 under the direction of Advisory Board staff and a review committee of Advisory Board members. Reviewers Henry Hersey and Michael Burke completed their tenure as designees before the study was finished and in early 1988, Maryann Foley followed Carol Wallace as Project Manager.

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SECTION 1 - INTRODUCTION

1.1 Overview

As part of its multi-year Urban Mass Transportation Administration (UMTA) funded study to examine future MBTA service, cost and funding alternatives, the Advisory Board has examined the Massachusetts Bay Transportation Authority (MBTA's) largest source of agency-generated revenue: fares. The subject is controversial and has generated considerable debate between advocates for more service and officials responsible for paying increasing deficits from limited resources.

In recent years, farebox revenue has not kept pace with MBTA operating cost increases. For example, between Fiscal Years (FY) 85 and 87, MBTA farebox revenue increased slightly over 5%, while taxpayers' subsidies for the Authority grew over 20%. There has been no fare increase since 1981.

The Advisory Board, primarily at the committee level, has engaged in a continuing dialogue with the MBTA and the Secretary of Transportation regarding MBTA fares. This study provides a timely opportunity to examine the MBTA's current fare structure from a number of perspectives, including its development, perceived inequities, ease of comprehension for passengers and, of course, its ability to generate revenue efficiently to keep pace with ever-increasing costs.

Section Two focuses on the current policy framework by examining key players and factors which are critical in determination of MBTA policy. The third section provides an historical perspective on the evolution of the T's current fare structure. Section Four briefly reviews alternative ways of defining and determining a transit fare structure. Section Five looks at MBTA costs (i.e., by service mode) and compares them to costs of other agencies.

The sixth section reviews MBTA ridership data. Section Seven examines efficiency issues concerning the current structure, specifically, peak vs. off-peak and distance-based pricing. The eighth section reviews the MBTA's transfer policy and the ninth section analyzes the MBTA's Pass Program. Section Ten focuses on several equity issues - the Green Line, MBTA commuter lot parking fees and express vs. local bus concerns. The eleventh section discusses revenue projections for various fare alternatives. Final recommendations are made in Section Twelve.

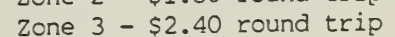
1.2 MBTA Service

The MBTA directly provides the following services: trackless-trolley routes, bus routes (express and local), five light-rail branches and three rapid-transit routes. The Green Line is a combination of subway service in the downtown area and low platform streetcar service on the surface. The MBTA also provides, under contracted services, commuter rail, commuter boat and private bus carrier services. Of the contracted services, only commuter rail will be included in this study since it is the largest and oldest contractually-provided MBTA service. The MBTA is currently under contract with Amtrak for commuter rail service. For Fiscal Year (FY) 88 the MBTA Service Planning Office estimated average weekday ridership at 593,000 for passengers traveling the basic T system. Commuter rail passenger average weekday ridership is estimated at 31,700 for Calendar Year (CY) 88. See pages 3 and 4 for maps of rapid transit and commuter rail service.

1.3 MBTA Fare Structure

The MBTA's current fare structure is zone based. The adult cash base fares are \$.60 for rapid transit and subway Green Line service; \$.50 for local bus and trackless-trolley service; \$1.00 for express bus and \$.75 for

MBTA Rapid Transit Zone Structure



surface Green Line service. The rapid-transit lines are divided into three zones, with just three stations beyond Zone 1 and a maximum one-way trip of \$1.20. Approximately 15% of all T bus routes are zoned. Local bus base fares are \$.50, good for all routes that are less than six miles and for the first six-mile zone on routes longer than six miles. Zone fares are an additional \$.25 for each three-mile increment, with a maximum fare of \$1.50 (see Appendix A). Express bus fares range from \$1.00 to \$1.50. The Mattapan High-Speed Line (light rail) fare is \$.25 for all stops, and free if traveling in or out of Ashmont on the Red Line. Fares on the surface portion of the Green Line (light rail) are paid in the inbound direction only and range from \$.75 to \$1.50. Commuter rail cash fares range from \$.60 to \$4.50 for a one-way trip to Boston.

SECTION 2 - POLICY FRAMEWORK

2.1 Policymakers and the Current Environment

Most U.S. transit systems, including the MBTA, do not operate on a cost-recovery basis. The difference between fare revenue and the marginal operating cost of each system is theoretically the value of the social benefits of public transportation and is typically in the form of a government subsidy.

Beyond a general reference in Section 161A of the Massachusetts General Laws (i.e., that express service except for commuter rail should break even; cf, page 13), the MBTA has no written policy on fares. However, the 1978 Program for Mass Transportation (PMT) provides T management with three broad goals which address the fare issue. They are:

- * Increased Riders. To attract additional riders who can be served at reasonable cost in relation to present costs per rider.
- * Equitable Fares and Service. To implement a fare structure and fare level which are equitable in terms of price per value received and to apply uniform criteria for the establishment and discontinuation of service.
- * Control of Overall Financial Burden. To bring under control the overall costs of supplying public transportation and to seek an equitable distribution of the resultant financial burden among riders and public revenue sources.

These goals, which are generally supported by Advisory Board members, provide a common framework for development of policy. Since the PMT was adopted there has been only one systemwide fare increase, in 1981. T officials were prompted to consider a fare increase due to a combination of skyrocketing expenses, allegations of MBTA mismanagement and an unwillingness of member cities and towns to absorb additional higher deficits.

As a result, in August 1981, rapid transit base fares were increased from \$.50 to \$.75. Bus fares, which were integrated under a common zone

structure, were doubled to a \$.50 base. In an agreement with the Executive Office of Environmental Affairs (EOEA), the MBTA pledged to review ridership changes and, in the event of a 10% or more drop in ridership, vowed to reduce rapid transit fares to \$.60.

The Final Environmental and Socioeconomic Impact Report of the MBTA Fare Increase confirmed that ridership had indeed dropped by roughly 15%, although only 9.4% of the ridership decrease was attributed to the fare increase (the bulk of the remainder was attributed to service changes). Consequently, in May 1982, the MBTA reduced rapid transit fares to \$.60.

The EIR Report, published in December 1983, and prepared by the Central Transportation Planning Staff (CTPS), represents the most recent comprehensive, published review of the MBTA's fare structure. The report included two key final recommendations:

- * A policy be adopted establishing a fare revenue goal as a percentage of the annual expense of operating MBTA services exclusive of fixed charges and private carrier subsidies; and
- * Fare revenue goals be reviewed annually and fare schedules adjusted as appropriate, in conjunction with the MBTA's annual budget development process, commencing with the fiscal year 1985 budget.

Although these recommendations have not been embraced with enthusiasm by the Secretary of Transportation or the MBTA, the Advisory Board has acted accordingly. Recent Advisory Board Annual Reports suggest that a mechanism to trigger small frequent fare increases is needed so that a major increase every five or ten years is avoided.

In recent years the Advisory Board has also consistently passed fare recovery ratio floors as part of its annual budget resolution, and has held to these parameters for the most part, during the annual budget process. A message has clearly been sent to the Secretary of Transportation and the MBTA that if they are opposed to fare increases (which, by all indications, appears

to be the case) they must be prepared to compensate for diminishing fare revenues by decreasing costs to maintain current ratios of fares to expense. Table 1, which compares MBTA fare revenue to total current operating expenses over the past decade, demonstrates that revenue increases have not kept pace with increases in expenses.

TABLE 1

MBTA FARE REVENUE AS COMPARED TO TOTAL CURRENT
OPERATING EXPENSES, 1976-1986

CHANGE FROM PREVIOUS YEAR

	<u>OP. EXPENSE</u>		<u>FARE REVENUE</u>	
	<u>CURRENT</u> <u>\$ (%)</u>	<u>CONSTANT</u> <u>\$ (%)*</u>	<u>CURRENT</u> <u>\$ (%)</u>	<u>CONSTANT</u> <u>\$ (%)*</u>
1976	+ 5	-3	+ 4	- 4
1977	+11	+6	+ 1	- 4
1978	+ 8	+2	+ 3	- 2
1979	+11	+1	+ 3	- 7
1980	+15	+2	+17	+ 4
1981	+ 2	-8	+24	+11
1982	+ 2	-2	+14	+ 9
1983	+ 6	+2	+ 2	- 3
1984	+10	+8	+ 6	+ 4
1985	+ 8	+3	+ 3	- 1
1986	+ 8	+5	+ 2	- .5
1987	+ 5	+1	+ 4	- 1

INFLATION RATE(%)

1976	8.3
1977	4.5
1978	5.3
1979	10.3
1980	12.7
1981	11.1
1982	4.1
1983	4.4
1984	2.3
1985	4.5
1986	2.6
1987	4.5

* Based on Boston CPI. Sources: Bureau of Labor Statistics: Multisystems Memorandum #1 (draft) - "Alternatives for Financing MBTA Operating Costs"; and MBTA Advisory Board Staff Report, "Senate Ways and Means Recommendations for Financing the MBTA and Senate Bill 1807."

Table 2 provides a more detailed review of what lies behind and has "driven" the Authority's fare recovery ratio. The figures demonstrate the ratio's slow, gradual decline over the past few years.

During deliberations for the FY 88 budget in November 1986, the Authority encouraged the Advisory Board to "temporarily suspend" its policy of maintaining a minimum fare recovery ratio in light of substantial planned service changes and expansion. The Authority maintained that these changes, including the opening of the Southwest Corridor in May 1987, the gradual expansion of service expected with a change from four to six-car trains on the Red and Orange Lines and the addition of cars on the Green Line, would over time lead to significantly higher ridership and increased revenues, but may temporarily cause a depressed fare recovery ratio. The T's argument brings to mind a recent study conducted by Ecosometrics, Inc., of Bethesda, Maryland for the U.S. Department of Transportation (DOT) which maintains that balancing service levels and fares entails finding the optimal combination of fares and service levels (for both the long and short run) which meets the budget constraint while maximizing ridership. The Advisory Board agreed to "sit tight" for FY88.

By all indications, it appears that the present administration, from the Governor down, is reluctant to suggest any sort of fare increase. In fact, the only recent action on fares taken by the MBTA Board of Directors was a decrease in September 1987 for nine commuter rail stations in or near downtown Boston. At the risk of oversimplifying the issue, there is a sense that key policymakers are concerned not only about a negative reaction from the public but are convinced, on philosophical grounds, that relatively low fares are optimal. On the other hand, many transit advocates feel that continued public support for transit expansion, etc. in the current Massachusetts climate necessitates a limit to the ever-increasing gap between costs and fare revenue.

TABLE 2

MBTA FARE RECOVERY RATIOS

	FY89 - AUTH	FY88	FY87	FY86	FY85	FY84
TOTAL OP EXP	\$473,783,356	\$443,212,482	\$412,401,644	\$392,918,432	\$364,442,936	\$335,267,642
LESS:						
LSS	9,680,922	7,934,534	4,610,263	3,948,989	2,600,403	2,173,480
RR SUB	62,244,006	57,208,511	54,260,304	52,986,189	52,260,500	46,074,972
INT UNF DEBT	14,735,100	11,076,020	8,466,317	13,340,144	16,310,463	12,811,548
NET COST	387,123,328	366,993,417	345,064,760	322,643,110	293,271,570	274,207,642
FARE REVENUE	118,000,000	112,214,359	108,609,506	104,814,370	103,189,675	97,498,518
FRR	30.48%	30.60%	31.48%	32.49%	35.19%	35.56%
COMMUTER RAIL						
TOTAL COST	\$87,744,905	\$82,442,579	74,333,194	70,580,208	69,042,354	65,938,226
TOTAL REVENUE	26,223,258	23,543,490	20,072,890	17,594,017	16,781,854	16,785,626
NET COST	61,521,647	58,899,089	54,260,304	52,986,191	52,260,500	49,152,600
REV/COST RATIO	29.89%	28.56%	27.00%	24.93%	24.30%	25.46%

The public's sentiment toward fare changes is difficult to gauge at best. Worth noting, however, are findings from a series of four focus groups held by Bell Associates in the Winter of 1987. These sessions involved a total of 40 Boston area individuals representing a wide range of transit users and non-transit commuters. The groups were specifically designed for another segment of the UMTA study involving alternatives for financing the MBTA. Participants were requested to discuss and select optimal financing strategies from a wide range of possibilities. Many focus group participants raised the subject of MBTA fares on their own and the majority were in favor of some type of fare increase. Some focus group members maintained that more riders would be attracted to the system with improved service quality even if fares increased significantly. Participants also discussed a willingness to assume a greater share of the T's expenses through fares if service was improved, rather than increasing the level of government subsidization. Far from conclusive, these sentiments nonetheless provide some insight.

2.2 Key Concepts: Equity and Efficiency

The concepts of equity and efficiency are the two key criteria frequently used to evaluate the implications of fare changes. They will be a critical factor in this analysis. For the most part, these criteria are complementary.

Efficiency for the purposes of this study is defined in terms which welfare economists call the "benefit" principle: passenger fares should cover the costs of transit service in proportion to the benefits passengers receive. In other words, passengers who receive more benefits (i.e., speed, reliability and convenience) should pay higher costs. Conventional wisdom usually assesses efficiency by comparing relative differences in the costs and revenues involved in trips of varying length and time-of-day.

There are several different ways to define equity. The principles that are generally agreed upon include:

1. Ability to Pay Principle - users should contribute to the cost of services according to their capacity to pay.
2. Consistency Principle - those receiving the same service should pay the same amount.
3. Benefit Principle - those receiving more benefits (i.e., in form of better quality in terms of speed, reliability or convenience) should pay higher fares.

2.3 Optimal MBTA Fare Structure Objectives

Adapted from authors Daskin, Schofer and Haghari, the following objectives outline what a transit agency's fare structure should ideally be based on:

1. Revenue and ridership maximization;
2. Equity in pricing;
3. Efficient allocation of passenger demand and transit service resources;
4. Price differentiation to reflect costs, benefits and service quality; and
5. Economical fare collection costs.

These objectives will be considered throughout the analysis.

2.4 State and Federal Regulations Regarding Fare Changes

2.4.1 State

Massachusetts General Laws, Section 161A (the MBTA's enabling act), define two basic types of MBTA service, "express" and "local." "Express" service refers to rapid transit and commuter railroad service on controlled rights-of-ways. "Local" service refers to MBTA buses (including express buses), trackless trolleys and streetcars in local streets. Section 5(e) of

the Massachusetts General Laws provides that local fares can not be changed without prior approval of the MBTA Advisory Board. The apparent rationale for not requiring Advisory Board approval for fare changes covering express service is included in Section 5(d). This section requires that express service (excluding commuter rail, the Highland Branch and the Mattapan High-Speed Line) should operate on a break-even basis, exclusive of debt service, "so far as practicable." Section 5(e) stipulates the appropriate "special" fares for senior citizens, students and children. There is no State law regarding special needs fares, although State legislators have deliberated the merits of several proposed bills.

The regulations of the EOEa, as adopted in accordance with the Massachusetts Environmental Protection Act (Massachusetts General Laws, Section 30, Sections 61-62H), specifically require the MBTA to file an Environmental Notification Form (ENF) for any systemwide fare increase cumulative over three years of 30% or more (pursuant to the regulations 301 CMR Sec. 11.27(2) promulgated as a result of the act). The MBTA's Legal Department, upon Advisory Board request, is researching whether the ENF must be filed prior to such a fare change. The filing of the "Notice" is the initial step in a several step environmental process. According to the T, based on a review of the ENF by EOEa, a determination is made regarding the necessity to file an Environmental Impact Report (EIR). The 1981 fare increase was expedited because EOEa granted the Authority permission to prepare an EIR after the fare increase was implemented.

2.4.2 Federal

The Urban Mass Transportation Act of 1964, Section 5(i) as amended requires the MBTA to indicate in its application for federal funds:

- 1.) certification that public hearings have been conducted (or afforded the opportunity for such hearings) regarding fare increases or decreases. According to regulations 49 C.F.R. 635.1 - 635.11, notice of intent to hold a public hearing must be published in a newspaper of general circulation in the affected urban area and must be published 30 days prior to the hearing; and
- 2.) whether or not the federal assistance requested will change the current level of service or fare. UMTA also stipulates that federal financial assistance for a project may not change the fare currently charged by the MBTA unless the MBTA has given consideration to the effect of energy conservation and the environmental, economic and social impact of the change in such fare.

Section 9(e)(3)(H), however, supercedes section 5(i)(3), according to 49 C.F.R. Part 635. UMTA amended its rule on public hearing requirements for fare changes to clarify the public hearing requirements of Section 5(i)(3). These requirements will no longer apply, with notice effective on October 10, 1986, whenever the agency which receives funds certifies compliance with Section 9(e)(3)(H). Compared to Section 5(i)(3), which pertains to fare increases or decreases, Section 9(e)(3)(H) mandates a "locally developed process to solicit and consider public comment prior to raising fares."

UMTA regulations 49 C.F.R. 609.23 require transit agencies to establish fares for elderly and handicapped riders which are no greater than one-half the full base fare. This mandate pertains only to off-peak travel hours. Also, UMTA Section 504 defines "handicapped person" to include both permanent and temporary incapacities. Additional UMTA regulations, 49 C.F.R. Part 27, finalized in May 1986, stipulate that handicapped patrons' fares "must be comparable to fares charged the general public for the same or similar trip."

According to UMTA officials this regulation refers to special services only, such as the RIDE.

See Appendix H for copies of key legislation and/or regulations and a memo from the Authority's Legal Department outlining governmental regulations.

2.5 Special Fares

In December 1982, House Bill 6568 reduced the fare for elderly riders from full-fare during peak hours and half price during off-peak hours to ten cents all day on all rapid transit, green line and local bus service. On commuter rail and express and zoned buses, the elderly would pay half of the full base fare during both peak and off-peak hours. The fare for handicapped and special needs riders was adjusted to equal the elderly fare during off-peak hours, but remained at the full base rate during peak hours.

In August and September 1985, in response to growing criticism from the special needs constituency, MBTA management conducted public hearings on a proposal to revise the Elderly and Special Needs Reduced Fare Program. Following these hearings, the Board of Directors approved a reduction in special needs fares to be consistent with fares for the elderly. The Advisory Board, which must approve any changes in local fares, approved the Board's new fare schedule in March 1986.

At this time T management was concerned about the "considerable abuse in the application and use of the six-month temporary Special Needs Identification Card". In particular, it was feared that decreasing the peak hour fare for special needs riders, thus making the card more valuable, could increase abuse. A task force, established to review the Elderly and Special Needs Reduced Fare Program, concluded that handicapped and special needs fares

should be restructured to equal that of the elderly, but that a ten cent fare for either group was insufficient. However, to raise the fare for the elderly would require changing State law, so the base fare remained (and is still) ten cents.

Other recommendations made by the task force were incorporated into the revised reduced fare program. These included increasing the price of the reduced fare identification card from 50 cents to \$3.00 in order to cover the actual administrative cost of producing the card and periodically changing the background color of the temporary disability cards in order to avoid abuse. In addition, the revised program instituted a six step application process, designed to tighten eligibility requirements for a special needs pass, thereby further reducing the risk of abuse.

The Elderly and Special Needs Reduced Fare Programs, as currently structured, are costly, with Massachusetts laws and T policy being far more generous than Federal requirements. In the Final Environmental and Socioeconomic Impact Report of the MBTA 1981 Fare Increase prepared by CTPS and published in December 1983, it was estimated that "revenue lost to the MBTA as a result of reduced fare programs for children, students, elderly and the handicapped is an estimated \$15.2 million per year..." As part of the staff summary for the Special Needs Reduced Fare Program (May 1985), the T estimated that lost revenue resulting from further reducing fares for elderly and handicapped riders would increase by \$862,000, bringing the total loss to approximately \$16.1 million. Advisory Board staff, using CTPS ridership survey data, estimate that 1/2 price children fares account for \$2.2 million of the \$16.1 million, leaving the loss attributable to elderly, handicapped and special student fares at \$13.9 million.

Even though there are no Federal requirements mandating reduced fares for students, or for elderly or special needs riders during peak hours, the State has the right to set a policy which goes beyond existing regulations and to subsidize both on- and off-peak transit fares for persons in these categories. A key question, though, is how such a policy can most efficiently, effectively, and equitably be implemented. Should the cost (in lost revenue) of subsidizing certain categories of riders be hidden as reduced income on the MBTA budget or would it make more sense to isolate the cost of reduced fares in each of these categories and attribute it to the appropriate State agency; i.e., Department of Elderly Affairs, Department of Education, Department of Handicapped Affairs? In this way, the cost of the policy itself becomes clear, and can be balanced with other State policies (and their costs) for the elderly, students or disabled people when tradeoffs must be made. It can be argued that better decisions might be made with costs identified and directly linked to policy. Furthermore, such a system would put more light directly on the T's pricing policy for basic adult and child fares.

Just such an approach has been successful in Europe. In their study of the financing of urban public transportation in six major European cities, Harold Wolman and George Riegeluth discuss three cities (Paris, Stockholm, and Hamburg) in which the subsidized fares for handicapped, elderly and/or student riders are paid by the local government, with additional aid from the federal/central government in two of the cases. Such a system relieves the transit agency of the burden and expense of policing implementation of a social policy and allows it to concentrate on that which it is better equipped to handle, namely transit. An added benefit for the T would be the improved ability to get more accurate passenger counts, since these are revenue based.

SECTION 3 - THE MBTA FARE STRUCTURE: AN HISTORICAL OVERVIEW

The following overview is designed to provide an historical context for current issues. Many of these issues (i.e., the Pass Program, free transfers and Green Line fares) will be discussed at length in Sections Six through Ten.

From 1946 to 1964, public transit service in the 14 core cities and towns of metropolitan Boston was provided by the Metropolitan Transit Authority (MTA). For most of the MTA's 18 year existence, fares were based on a flat systemwide fare with free transfers between different modes and special discounts for short local rides. This meant that a passenger whose journey required transferring from bus to rapid transit paid his or her fare on the bus and received a paper transfer valid upon entering the rapid transit system.

In 1961 the MTA abolished both the systemwide flat fare and free transfers for adult passengers, abandoning a concept pioneered in Boston. Free transfers, or transfers for a minimal charge, still exist in many American cities (see Table 3 on next page). Passengers who made multi-mode journeys were now required to pay separate fares for each mode. Since MBTA ridership counts have been historically derived from revenue divided by an estimate of the average fare paid by each rider, it is difficult to accurately determine the impact the elimination of transfers had on ridership levels. For most riders, fares were effectively doubled; tripled for some.

In 1964 the Legislature created the Massachusetts Bay Transportation Authority (MBTA) to assume and expand the operations of the MTA. The MBTA District was expanded from 14 cities and towns to 78. At its inception, the MBTA adopted the MTA's flat-fare of \$.20 for the rapid transit service and

TABLE 3

APTA TRANSIT FARE SUMMARY FEBRUARY 1, 1987
SUMMARY TABLES

Fixed Route Transit Fares

No. in Survey with Fares between:	Number of Systems	Per Cent	Boston
0 - 20 cents	3	1.0%	
21 - 45 cents	29	9.6%	
46 - 65 cents	165	54.6%	****
66 - 85 cents	80	26.5%	
86 - 100 cents	23	7.6%	
101 - 150 cents	2	0.7%	
Total:	302	100.0%	
Average Fare:	\$.62		
Median Fare:	\$.60		

Note: Table summarizes adult fixed route weekday cash fares. For multi-modal systems motor-bus fares are used.

No. in Survey With:	Number of Systems	Per Cent	Boston
Transfer Charges			
No Transfer	30	9.9%	****
Free	174	57.6%	
Transfer Charges	98	32.5%	
Zone Charges			
No Zones	200	66.2%	
Zonal, Regional or Special Route Charges	100	33.1%	****
No Response	2	0.7%	
Passes or Permits*			
No Passes or Permits	86		
Daily	16		
Weekly	25		
Monthly	168		****
Annually	12		****

*Systems may offer more than one pass.

\$.10 for bus and surface streetcar service. Reduced fares and free transfers remained in effect only for children (ages five to 11) and students.

In September 1967 the first express bus route was established, running from Watertown to Boston via the Massachusetts Turnpike. The fare was set at \$.40.

For its first four years of operation, with minor exception, the scope of the MBTA's bus and rail operation was limited to the service which had been provided by the MTA. In 1968, the MBTA acquired the assets of the Eastern Massachusetts Street Railway Company, then one of the largest intra-state private bus carriers in the country. Eastern Mass. service extended from southern New Hampshire, throughout eastern Massachusetts to Taunton, Fall River and New Bedford. A route also ran from Taunton to Providence, Rhode Island. After purchasing Eastern Mass., to be known as the MBTA Suburban Division, the MBTA continued only those routes within the T District, trunk routes to Lowell and Brockton and local city service in Lowell (under contract to the City of Lowell). All other former Eastern Mass. routes were either abandoned or transferred to various private carriers.

Fares on former Eastern Mass. routes had been based on a zone system with the zones of varying length on each route. After takeover, the MBTA adopted a fare structure for the Eastern Mass. Division of \$.30 for the first zone, with \$.05 and \$.10 zones (depending on the length of the zone) thereafter. Transfers, which were valid only among former Eastern Mass. routes, could be purchased for \$.10.

In 1968 the flat fares in effect for the MBTA's base network were raised from \$.20 to \$.25 for rapid transit service and from \$.10 to \$.20 for local buses and surface streetcars. Fares on Eastern Mass. Division routes were not changed.

In 1969 the T introduced reduced fares for senior citizens over 65 on all routes and services. As of August 1969, Section 161A of the Massachusetts General Laws required that senior citizens pay no more than one-half the full adult fare on both subways and surface lines.

With the September 1971 opening of the Red Line extension to Quincy Center, the MBTA introduced zone fares for the first time on its rapid transit lines.

Until 1971 the MBTA bus drivers provided change for passengers who did not have the exact fare. A nationwide increase in armed theft of bus drivers forced the MBTA, along with a good number of U.S. transit agencies, to eliminate change-making on surface vehicles. As a result, the exact fare policy was instituted in October 1971. Although the exact fare system resulted in minor inconvenience to passengers, it has been termed very effective in reducing armed holdups.

In 1972 the Middlesex and Boston (M&B) Street Railway, a large private bus carrier serving District cities and towns to the west of Boston, went bankrupt and ceased all operations. In response to community outrage over the loss of local transportation, the MBTA assumed the operation of most of M&B's routes. In doing so, the MBTA retained M&B's zone fare structure. Fares were set at \$.30 for the first two zones and \$.10 per zone thereafter.

The MBTA's only experiment with peak/off-peak pricing began in 1973. Dubbed "Dime Time", the program reduced rapid transit fares to \$.10 on weekdays between 10:00 a.m. and 1:00 p.m. (later extended to 2:00 p.m. and extended to Green Line stations). Dime Time was not considered successful and was discontinued in 1975. A 1974 study by Decision Research, Inc. (DRI), was unable to quantify any gain in ridership.

In 1974 the MBTA inaugurated what has become one of the most successful prepaid monthly pass programs in the nation. For the first five years of the program, passes were available only through payroll deduction from member employers. In 1979 passes became available to the general public at a handful of sales outlets. A pass-by-mail program was instituted in 1986. A detailed analysis of the MBTA's pass program is covered in Section Nine.

Small discounts are currently available with two other options: a \$14.00 ten-ride ticket can be used on any vehicle for which the cash fare is \$1.50. A 12-ride ticket may be purchased on commuter rail lines for the price of 11 rides (with the exception of Zones 1A and 1AA). See Appendix B.

In September 1975 the MBTA raised bus fares from \$.20 to \$.25 bringing them in line with rapid transit fares. Surface streetcar fares were not raised at this time. In addition, base fares on the former Eastern Mass. and M&B Divisions were reduced to \$.25 from \$.30, presumably to make them consistent with other bus fares. Zone charges became a standard \$.10 on both divisions. For the next five years, fares remained unchanged.

Also in 1975 there were small increases in some commuter rail fares. Additional small commuter rail fare increases occurred in 1978, 1980 and 1981. There are currently 11 zones in the commuter rail system, with fares ranging from \$.60 to \$4.50 for one-way trips to Boston (\$22.00 to \$104.00 for monthly passes).

In 1975 half-price fares were introduced for special needs riders during off-peak hours.

In June 1980, rapid transit fares were doubled to \$.50. The three surface streetcar lines, which had been charging a \$.20 surcharge on the surface portion, now charged \$.25 or a combined subway/surface fare of \$.50. Bus fares remained \$.25.

In August 1981, MBTA rapid transit fares were increased from \$.50 to \$.75 and bus fares were doubled to \$.50. For purposes of this fare increase proposal, both subway and surface portions of the streetcar network (the Green Line) were considered "rapid transit." Thus, on the surface portion of the Green Line, fares rose 200% - from \$.25 to \$.75.

Also, as part of the new fare structure, all MBTA bus service was, for the first time, integrated under a common zone structure. A base zone was set at six miles from the route origin; subsequent zones were three miles in length. The new bus fares became \$.50 for the first zone and \$.25 for each additional 3-mile zone. The maximum bus fare was set at \$1.50.

Also effective August 1981, senior citizens and special needs riders were able to use the system at no charge during off-peak hours. Senior citizens had reduced fares at peak times, however special needs riders were required to pay the regular adult fare during peak hours.

As discussed in Section Two, the MBTA had an agreement with EOEa to reduce rapid transit fares to \$.60 if a follow-up study confirmed that ridership dropped by at least 10%. Consequently, effective May 1982, the MBTA rapid transit fare was reduced to \$.60 since ridership declined roughly 15%.

When rapid transit fares were reduced in 1982 the fare reduction was designed to be implemented at only those stations where access is controlled by turnstiles. All surface portions of the Green Line were excluded. At this point the Green Line was not considered a rapid transit line. Thus, on the surface portion of the Green Line, fares, which are paid in the inbound direction only, range from \$.75 to \$1.50. The Green Line basically constitutes a third layer of the fare structure.

In December 1982, as a result of State Legislation, the free off-peak (and half-fare peak) fares for senior citizens were replaced by a \$.10 fare at

all times. This excluded express bus trips beyond the local area and commuter rail, for which seniors pay one-half the adult fare. Although not included in the State legislation (special needs fares are only mandated at the federal level), also effective December 1982, special needs riders were required to pay full adult fares during peak hours and \$.10 off-peak. In 1986 this was changed by the T with the approval of the Advisory Board, so that the senior citizen fare applies to special needs riders at all times.

Children have had some version of reduced fares for years. Beginning in 1981, Boston public school students who used rapid transit were issued tokens at \$.35 apiece. The tokens were reduced to \$.30 the following year. Since September 1982, student passes have been available and can be used on either bus, rapid transit or light rail. Currently, children between five and 12 pay half-fare at all times. Students in kindergarten through 12th grade pay half-fare during school hours if they have proper identification. Monthly student passes are available from schools. Off-peak family fares are available with commuter rail service and range from \$3.00 to \$15.00 depending on distance (see Appendix B).

SECTION 4 - ALTERNATIVE PRICING STRATEGIES

4.1 Marginal, Average And Incremental Costs

Numerous fare policy studies have examined the issue of marginal vs. average costs. In economics a transportation mode is efficiently used when differentials in costs and benefits are reflected in the price structure. A fare set equal to marginal costs (the increase in cost required to provide an additional unit of service) would result in an efficient or optimal level of operation. A marginal cost pricing scheme would require a patron's fare to fluctuate with variables such as time of day, travel time, traffic congestion level (for bus routes), trip length and quality of ride. Such a system of fares would be expensive to implement and oversee.

A more practical fare structure might strike a compromise between highly detailed marginal cost pricing and simple (average cost) uniform pricing. Such a compromise, through pricing by incremental costs, represents a feasible measure for assessing cost changes. This can be accomplished by levying a fare commensurate with the average incremental cost of serving all passengers, who, for example, travel roughly equal increments of distance or who travel during the same time period. These two key incremental measures, distance and time-of-day, will be discussed at length in Section Seven.

4.2 Time-Valued Fares

According to a University of California study, Turvey and Mohring, Wohl and Frankena recommend using the value of time as the primary basis for pricing. These authors, who refer specifically to bus travel, maintain that the time cost of each passenger is the total value of his or her time spent waiting for the bus, the accumulated dwell time for other passengers to board

and alight and the travel time required to cover the distance of the trip. They maintain that the marginal social cost of an additional transit patron's trip consists of the value of the passenger's own travel time in addition to the marginal congestion costs each additional passenger imposes on all the other transit and roadway users. For example, in the case of bus service, time costs would depend on a number of variables including travel speeds, the number of stops and traffic flow. The major difficulty in implementing a fare system based on time costs is that the patron's waiting and travel times would all have to be valued. No performance data could be found on this type of system.

4.3 Quality-Based Fares

Cervero et al. maintain that the concept of "quality-based" fares is gaining increasing acceptance. In this approach transit is viewed as a "bundle of services" and fare policies are geared toward pricing according to whatever passengers (the consumers) are willing to pay for a set of "travel characteristics."

Presumably, this concept would best be used by a brand new transit system since market segments should first be defined (in terms of travel need) and then appropriate services provided at fares which are equal to the value users place on them.

Furthermore, there is an inherent difficulty in defining the "quality" of transit. A 1981 Harvard study which evaluated alternative MBTA fare structures came up with three important indicators of quality of service:

1. Average Speed of Transit Trips - affects the time spent in the transit vehicle;

2. Percentage of Scheduled Trips Not Run - affects the likelihood that a trip can be made within the time a rider schedules for it; and
3. Scheduled Headway Between Vehicles - affects the time spent waiting for the vehicle.

Without question, there are other variables which could be used to define service quality, including passenger comfort and proximity to service.

SECTION 5 - MBTA EXPENSE/REVENUES AND COMPARISONS TO OTHER TRANSIT AGENCIES

5.1 MBTA Expenses vs. Revenues

According to the Advisory Board's FY86 Annual Report, MBTA direct expenses per service mile have averaged a 3.6% annual increase since CY81. When considering that the Boston area CPI has risen 3.7% annually on average since 1981, this figure looks quite positive - especially in light of the several new initiatives (i.e. expanded maintenance program) and improvements made during this period.

However, the report further points out that the MBTA's net cost of service per revenue mile has risen an annual average of 5.7% since CY81. The difference between the rate of gross (3.6%) and net (5.7%) costs is explained by the fact that fares have not risen since 1981 and ridership increases have not kept pace with increases in expenses. As indicated in Table 4, fare income as a percentage of total MBTA income/support has steadily decreased from 25.5% in CY82 to 21.17% in CY87.

5.2 MBTA Costs by Mode

Tables 5 and 6 provide comparative cost figures between T-delivered service and commuter rail service, and between bus, rapid transit, streetcar and trolley service, respectively.

TABLE 4

MBTA REVENUE, EXPENSE AND DEFICIT

	CY1987	CY1986	CY1985	CY1984	CY1983	CY1982	CY1981
Fare Revenue	110,751,992	106,664,373	104,507,979	101,021,209	94,940,086	93,272,962	81,811,655
Total Revenue	128,697,127	125,147,108	120,867,565	111,872,820	108,172,694	106,153,152	104,168,096
Total Operating Expenses	425,163,860	404,854,568	378,800,494	353,531,695	309,842,100	308,726,001	310,999,428
Fixed charges	86,511,697	81,579,084	73,576,132	65,528,618	59,674,915	48,781,090	37,842,184
Total current Expenses	511,675,557	486,433,652	452,376,626	419,060,313	369,517,015	357,507,091	348,841,612
State Contract Assistance							
Debt (MTA)	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
Debt (MBTA)	71,049,864	64,841,980	58,994,100	50,695,002	46,176,296	37,660,762	29,906,496
Other	9,584,675	9,245,699	9,197,758	7,680,636	6,041,754	6,004,137	6,601,398
Federal Operating Assistance	18,809,832	20,544,621	21,338,201	26,498,651	21,338,201	23,199,913	26,236,287
NET COST	280,534,059	263,654,244	238,979,002	219,313,204	184,788,070	181,489,127	178,929,335
State	181,888,082	166,149,211	143,220,878	125,543,540	104,862,532	91,646,309	96,404,825
#Cities and Towns	110,170,875	107,483,780	104,862,224	102,304,609	99,809,375	97,375,000	95,000,000
Interest	11,524,898	9,998,747	9,104,100	8,534,946	9,883,838	7,532,182	12,475,490

SOURCES OF INCOME/SUPPORT AS PERCENTAGE OF TOTAL EXPENSES##

State Debt Assistance	14.15%	13.67%	13.43%	12.56%	12.96%	11.14%	9.11%
State Reimbursement for RR	1.83%	1.86%	1.99%	1.80%	1.59%	1.64%	1.83%
State Share NET COST	34.76%	33.47%	31.04%	29.36%	27.64%	25.11%	26.68%
Cities/Towns Share NET COST	21.06%	21.65%	22.72%	23.93%	26.31%	26.68%	26.29%
Federal Operating Assistance	3.60%	4.14%	4.62%	6.20%	5.62%	6.36%	7.26%
Fare Revenue	21.17%	21.49%	22.65%	23.63%	25.02%	25.55%	22.64%
Other Revenue	3.43%	3.72%	3.55%	2.54%	3.49%	3.53%	6.19%

Sources: Advisory Board Annual Reports

Interest is included in cities and towns total

Sources of support covering T expense includes interest to cities and towns as an expense.

MBTA Statement of Facts to State Treasurer

MBTA Current Expense Budget Report, 1976

TABLE 5

FY86 NET COSTS

FY86 net costs per revenue mile:

T Service - \$ 5.30

Commuter Rail - 6.86

FY86 net costs per passenger (T subsidy):

T Service - \$ 2.00

Commuter Rail - 4.58

Source: MBTA Advisory Board FY86 Annual Report

TABLE 6

1984 SECTION 15 DATA - MBTA COSTS BY MODE

	Annual Actual Vehicle Revenue Miles (\$000)	Total Operating Expenses (\$000)	Cost/ Vehicle Revenue Mile
Bus	20,998.9	112,074.9	5.34
Rapid Transit	16,827.7	142,153.1	8.45
Light Rail/ Streetcar	1,651.5	22,335.1	13.52
Trackless Trolley	561.1	3,775.5	6.73

Source: 1984 Section 15 data

Note: No comparable figures were available for commuter rail service.

5.3 Fare Recovery Ratios: National Survey Findings

When determining appropriate fare levels, it is helpful to compare the MBTA's fare recovery ratio to other agencies. This ratio indicates the proportion of system costs which are paid by riders rather than by government

subsidies. In 1986 the Advisory Board circulated a survey to several large, comparable agencies in order to collect data and calculate in a similar manner fare recovery ratios for major transit systems. Appendix C includes a copy of this form and Table 7 summarizes the survey results. It is important to note that the MBTA's fare recovery ratio has declined since FY85 (35.2%), the period included on the survey. This figure includes only costs for services operated directly by the T. Commuter rail, a service contracted to an outside vendor, has historically had a lower fare recovery ratio. See Table 2 for a review of these MBTA fare recovery ratios.

Survey statistics on revenues and expenses for the transit systems represent a time period from FY85 to FY87. Ratios ranged from 26.1% to 66%. Out of a total of 13 respondents, only four agencies (in addition to the MBTA), have neither a formal or informal, official or unofficial policy regarding fare recovery ratios. As of January 1987 at least three agencies - Dallas Area Rapid Transit (DART), Philadelphia (SEPTA) and New York (NYCTA) - expected to increase fares and/or recovery ratios in the immediate future.

Only three of the 13 respondents reported ratios below the T's: St. Louis - Bi-State, San Francisco Municipal Railway and DART. Spokespersons from both St. Louis and San Francisco stated that the agencies "could afford" to have a low recovery ratio (26.1% and 32.7% respectively) because of state funding through a dedicated sales tax. Clearly, a number of factors are at work here. Apparently DART, with the second lowest ratio (27.6%), had witnessed a gradual decrease in the ratio over the three years prior to the reported FY86 figures. However, plans for the previously mentioned fare increase were implemented in January 1987 when fares were raised to \$.75 - \$2.25.

TABLE 7

FARE RECOVERY RATIO SURVEY

TRANSIT SYSTEM	NO. OF VEHICLES OPERATED IN MAX SERVICE	MODE*	TIME PERIOD COVERED	FARE FOR PERIOD COVERED	FARE REVENUES	/ EXPENSES / SUBTOTAL	FARE = RECOVERY RATIO	REQUIREMENTS (LEGISLATIVE, OR POLICY)
ATLANTA- METROPOLITAN ATLANTA RAPID TRANSIT AUTHORITY (MARTA)	500-999	MB RR	FY 1987	RAPID TRANSIT \$.60	\$43,370,626	/ \$123,119,069	= 35.2%	RATIO MUST BE AT LEAST 35% - BASED ON FARE REVENUE BUDGET FOR CURRENT YEAR AGAINST PRIOR YEAR'S TRANSIT OPERATING EXPENSE.
CHICAGO- CHICAGO TRANSIT AUTHORITY (CTA)	1,000+	MB RR DR	FY 1985	RT \$1.00 - \$1.20 BUS \$.90- \$1.10	\$272,925,066	/ \$585,001,316	= 46.65%	LEGISLATION REQUIRES A 50% RECOVERY RATIO FOR THE ILLINOIS REGIONAL TRANSPORTATION AUTHORITY.
MILWAUKEE- COUNTY TRANSIT SYSTEM	500-999	MB	FY 1986	BUS \$.85- \$1.05	\$28,960,267	/ \$63,570,460	= 45.56%	AN UNOFFICIAL POLICY ADVISES A RECOVERY RATIO OF 50%.
PHILADELPHIA- SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY (SEPTA)	1,000+	MB RR SC TB CR	FY 1986	RAPID TRANSIT \$1.00	\$273,093,000	/ \$485,605,000	= 56.2%	RATIO MUST BE 48% TO RECEIVE STATE SUBSIDY.
ST. LOUIS- BI-STATE DEVELOPMENT AGENCY	500-999	MB	FY 1986	RAPID TRANSIT \$.75- \$1.00	\$23,366,661	/ \$89,402,471	= 26.1%	A POLICY GOAL IS SET ANNUALLY BY THE BOARD OF COMMISSIONERS.

TABLE 7 (CONTINUED)

FARE RECOVERY RATIO SURVEY

TRANSIT SYSTEM	NO. OF VEHICLES OPERATED IN MAX SERVICE	MODE*	TIME PERIOD COVERED	FARE FOR PERIOD COVERED	FARE REVENUES	/ EXPENSES / SUBTOTAL	FARE = RECOVERY RATIO	REQUIREMENTS (LEGISLATIVE OR POLICY)
SAN FRANCISCO- SAN FRANCISCO MUNICIPAL RAILWAY	1,000+	MB SC TB	FY 1986	RAPID TRANSIT AND BUS \$.75	\$62,053,344	/ \$189,780,404	= 32.7%	RATIO MUST RE- 28% TO RECEIVE STATE SUBSIDY.
WASHINGTON- WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY (WMATA)	1,000+	MB RR	FY 1986	RT \$.80- \$2.40 BUS \$.75- \$.80	\$199,069,700	/ \$419,013,300	= 47.5%	AN UNOFFICIAL POLICY STATES THAT TOTAL SYSTEM REVENUES MUST MEET 50% OF OPERATING COSTS.
BOSTON- MASSACHUSETTS BAY TRANSPORTATION AUTHORITY (MBTA)	1,000+	MB RR SC TB	FY 1986	RAPID TRANSIT \$.60- \$1.20 BUS \$.50- \$1.50	\$104,814,370	/ \$322,643,110	= 32.49%	NONE.
LOS ANGELES- SOUTHERN CALIFORNIA RAPID TRANSIT (SCRTD)	1,000+	MB	FY 1986	BUS \$.85	\$196,142,000	/ \$495,781,000	= 39.6%	NONE.

TABLE 7 (CONTINUED)

FARE RECOVERY RATIO SURVEY

TRANSIT SYSTEM	NO. OF VEHICLES OPERATED IN MAX SERVICE	MODE*	TIME PERIOD COVERED	FARE FOR PERIOD COVERED	FARE REVENUES	/ EXPENSES / SUBTOTAL	FARE = RECOVERY RATIO	REQUIREMENTS (LEGISLATIVE OR POLICY)
NEWARK- NEW JERSEY TRANSIT CORPORATION	1,000+	MB SC CR	FY 1985	RAPID TRANSIT \$.85- \$1.50	\$258,876,000	/ \$494,451,000	= 52.4%	NONE.
NEW YORK CITY- NEW YORK CITY TRANSIT AUTHORITY	1,000+	MB RR	FY 1985	RAPID TRANSIT \$.90 BUS \$1.00- \$3.50	, 332,192,000	/ , 769,159,000	= 48.1%	NONE.
PITTSBURGH- PORT AUTHORITY OF ALLEGHENY COUNTY (PAT)	1,000+	MB SC IP	FY 1986	RAPID TRANSIT \$.60- \$1.00	\$49,641,354	/ \$131,880,771	= 37.6%	NONE.

*MODE:

MB - MOTOR BUS

RR - RAPID RAIL

TB - TROLLEYBUS

SC - STREETCAR

CR - COMMUTER RAIL

DR - DEMAND RESPONSIVE

IP - INCLINED PLANE RAILWAY

With the exception of Pittsburgh (PAT) and the MBTA, those agencies with relatively low fare recovery ratios (below 47.5%) are funded by state and local governments through dedicated taxes, primarily the sales tax. PAT recently experienced a serious fiscal crisis and came close to at least temporarily suspending service.

5.4 Section 15 (UMTA) Performance Data and MBTA Costs

Not only do MBTA passengers pay a lower share of operating costs than many of their counterparts across the country, as evidenced by the previous section, but T costs tend to be higher than those in other systems - at least according to data available through 1984 from the U.S. Department of Transportation (DOT).

The data, collected and validated annually at DOT, presents problems if used too stringently in a comparative analysis since the various transit systems have different accounting practices as well as unique characteristics which may not get recorded within the constraints of the DOT term definitions. For example, systems with limited traffic and circuitous routes are favored. Nonetheless, in comparisons based on revenue miles the statistics do offer an opportunity to look at general relative performance data which is not readily available elsewhere.

Section 15 data based on 1984 performance indicates that the MBTA ranks eighth of nine in operating cost per vehicle mile for bus service when comparing the nine U.S. transit systems with over 1,000 total vehicles. In 1983 the MBTA ranked sixth of seven in the same category, which included the seven (over 1,000 vehicle) U.S. systems offering both bus and rapid transit service.

TABLE 8

SECTION 15 BUS OPERATING COST DATA - 1983 AND 1984

1983 Bus Operating Cost/Vehicle Mile		1984 Bus Operating Cost/Vehicle Mile	
MARTA (Atlanta)	\$ 2.69	Seattle Metro	\$ 3.10
RTA (Cleveland)	3.58	N.J. Transit (Newark)	3.43
WMATA (Washington)	4.15	PAT (Pittsburgh)	3.64
SEPTA (Phila)	4.17	SCRTD (LA)	3.90
CTA (Chicago)	4.40	SEPTA (Phila)	4.09
MBTA	4.56	WMATA (Washington)	4.35
NYCTA (NYC)	6.33	CTA (Chicago)	4.67
		MBTA	4.70
		NYCTA (NYC)	7.21

NOTE: Both MARTA and Cleveland RTA did not meet the 1,000+ vehicle criteria in 1984. Consequently, in 1984 agencies meeting 1,000+ with either bus or rapid transit (rather than both, as in 1983) were added to broaden the comparison.

A detailed analysis of 1983 figures by Advisory Board staff (published in Spring 1985) indicated that vehicle miles per employee, mileage per vehicle and vehicle hours per operator were the measures most directly correlated to low per mile bus costs. Although slightly better than average in its ratio of employees to vehicles in 1983, the T recorded low vehicle miles per employee.

A review of similar data on rapid transit indicates even poorer relative performance than bus in 1983 and 1984. However, the number of cars per train varies during the day and personnel requirements vary across systems depending on the type of equipment used. Nonetheless, it is worth noting that in 1983 the MBTA ranked seventh out of the seven largest (over 1,000 vehicle) U.S. systems offering both bus and rapid transit service. Once again, in 1984 the MBTA ranked fifth of five when compared to the five U.S. transit systems (over 1,000 vehicles) with rapid transit service.

TABLE 9

SECTION 15 RAPID TRANSIT OPERATING COST DATA - 1983 AND 1984

1983 Rapid Transit Operating Cost/Vehicle Mile		1984 Rapid Transit Operating Cost/Vehicle Mile	
CTA (Chicago)	\$ 4.07	CTA (Chicago)	\$ 4.40
MARTA (Atlanta)	4.14	SEPTA (Phila)	5.47
RTA (Cleveland)	5.55	NYCTA (NYC)	6.24
NYCTA (NYC)	5.91	WMATA (Washington)	7.26
SEPTA (Phila)	6.32	MBTA	7.67
WMATA (Washington)	6.53		
MBTA	7.88		

The 1983 analysis determined that the number of vehicle miles per employee - as with bus service - appeared to be the force which drove MBTA costs above those of other large systems. These 1983 and 1984 figures, although not particularly timely, indicate that attention must be paid to cost-efficiency measures in addition to considering the possibility of the riders' share of cost.

SECTION 6 - MBTA RIDERSHIP DATA

6.1 Ridership Data in General

Over the past several years the Advisory Board has repeatedly requested that the MBTA provide comprehensive ridership data, including both actual ridership and projections for the future. Ridership figures reflecting the effect of service changes (i.e., ridership figures for the new Southwest Corridor) or the projected fiscal impact of a service change are frequently missing from staff summaries and key reports used for service planning and budgeting purposes. A case in point is the Budget Office's acknowledged methodology for projecting fare revenue during the FY89 annual budget process. In its projections, the Office assumed that since FY87 fare revenues increased 3.6% over FY86, revenues will increase another 3.6% from FY88 to FY89. This analysis did not take into account a number of planned service changes, such as the planned increase in revenue miles from 46 million to 50 million between FY88 and FY89.

Attempts to obtain comprehensive actual ridership figures to use for analysis in this study have been fruitless. Only Amtrak, which provides commuter rail service and is required by its contract with the T to provide ridership counts, keeps regular ridership counts.

The current fare collection system measures tokens deposited and most pass use but does not count all riders. As a consequence, most, if not all of the ridership data the MBTA has forwarded for this analysis is revenue-based estimates. According to the Authority, actual "body counts" - rather than revenue-generated information - is only done on a sporadic, as-needed basis for particular projects that are limited in scope (i.e., three stations on a particular rapid transit line).

Ridership information broken down by time-of-day or by special fare groups is not regularly available, nor is any origin-destination information. Furthermore, no auditing system fully records pass usage on bus and rail lines. There is also indiscernible pass usage overlap between T-provided service and commuter rail service.

6.2 MBTA Fare-Mix Sampling Program

Until 1981 the MBTA estimated daily and annual ridership by dividing collected revenue by an average fare. In 1981 it was determined that the average fare figure being used was no longer valid because of various system and fare changes. Consequently, the MBTA established a new program for establishing ridership whereby the average fare used to calculate the number of riders from revenue is now determined by sampling actual ridership. CTPS has traditionally processed and analyzed the resulting data. A recent determination was made to conduct this fare-mix study every two years rather than annually.

The sampling program is designed to estimate an average fare paid (excluding contracted services such as commuter rail) on the MBTA in order to estimate ridership from revenue. The average fare is determined by sampling selected bus routes, surface lines and rapid-transit stations. In 1985 130 bus trips representing all garages were sampled from a total of 13,556 average weekday trips. Data sampled includes the number of passengers boarding, the type of fare paid and farebox revenue.

Historically, the authors of the annual fare mix studies have documented more than enough flaws in the sampling and assumptions of methodology to raise questions about its usefulness. For example, the survey design and

significant parts of the analysis rely on trip-making patterns obtained from a 1978 systemwide passenger survey. This survey indicated that 29% of riders use rapid transit only, 31% are surface-only users and 40% of T passengers combine a surface and rapid transit trip to arrive at a destination. The fare-mix analyses assume that these proportions are still valid because there is no more recent data available.

The survey data compiled from the sampling program is supplemented by other revenue-based information from the T. For example, a computer printout, the RTL 210, is the source of information for the number of passes, tokens used and daily cash receipts, but the data in this printout must be adapted "because passmeters at a number of stations are disabled, registering no values or incorrect ones." (1985 MBTA Fare-Mix Sampling Program).

Exacerbating the problem, CTPS was also forced to work around the discovery that at many stations gateman's boxes were "open unofficially". These same observations appear in more than one CTPS fare mix report.

A statement made in a report by the Advisory Board Finance Committee in September 1981 is still applicable:

Private sector service delivery corporations make it their business to know a great deal about their current and potential customers in order to attract those customers and to design services to meet their needs. The MBTA should do no less.

6.3 The Ideal Solution

A preliminary study on fare collection conducted by the Advisory Board in late 1986 - and still in draft form - concludes that in rapid transit stations

Ideally, the MBTA should have a system of interconnected turnstiles, S boxes and passreaders which electronically transmit revenue and ridership to a central computer.

A highly sophisticated system was installed in Washington, D.C. for approximately \$1.8 million. It involved connecting more than 1,500 separate pieces of fare collection equipment, a figure the draft report estimates would be "far more formidable" than would be required for the MBTA. Yet, even in Washington officials estimate that complete cost recovery took place in less than a year.

In terms of bus service, in 1986 the MBTA completed limited revenue service testing of an electronic bus farebox which has the capability to transfer revenue and ridership data directly into a computer database for later analysis. Although the T was apparently satisfied with the results, no order for this (or similar) equipment has been placed to date. It is reasonable to assume that the issue of ridership data is not a high priority with T management.

SECTION 7 - EFFICIENCY ISSUES AND THE MBTA FARE STRUCTURE

7.1 Peak Vs. Off-Peak Pricing And Efficiency Considerations

7.1.1 Overview

Since efficiency requires that higher fares be charged for more transportation service, it is important to consider the costs of providing peak vs. off-peak service. Most transit experts agree that transit costs are markedly higher during peak periods (i.e., 6:30-9:30 a.m. and 3:30-6:30 p.m. at the T) primarily because additional staff must be hired to accommodate rush hour loads and the marginal cost of additional ridership includes increased capital costs for equipment. Further, there is generally a disproportionately high demand for service to outlying areas, creating, for example, higher costs due to deadheading.

Transit analysts including Rock, Zavatiero, Leutze, Ugolik and Cervero argue that with flat or very simple zone fares short distance, off-peak users pay disproportionately high fares to offset losses incurred in serving long-haul, peak hour trips. (See next subsection for a more detailed discussion of distance-based pricing). Altshuler maintains that peak period service expansion, often to suburban areas, tends more generally toward regressive fares because transit use by relatively lower income people (who have lower rates of labor force participation and high rates of transit use for non-work trips) tends to be much less concentrated in peak periods than that of other groups.

Robert Cervero, who has written extensively on peak vs. off-peak pricing, received returns on a survey from over 100 transit officials representing 69 U.S. transit agencies. The survey was designed to gauge

attitudes and experiences with time-of-day pricing. Cervero's 1984 findings indicate that the reasons for instituting time-of-day pricing were, in order of importance to transit agency managers:

- a. encourage increases in off-peak ridership;
- b. increase farebox revenues (in systems where a peak surcharge was introduced);
- c. effectuate cost-based pricing;
- d. minimize ridership losses (through peak-only price increases);
- e. help the disadvantaged;
- f. strengthen downtown shopping areas (encourage midday travel to downtowns).

7.1.2 The MBTA's Past Experience and Possible Future Options

As discussed in Section 1, the MBTA experimented with peak/off-peak pricing in 1973 with the Dime Time program. The program, which only covered off-peak fare reductions for rapid transit and Green Line service, was deemed unsuccessful and was discontinued two years later. DRI, a consultant hired by the Authority to evaluate the program, was unable to quantify any ridership gains. While the Dime-Time program did cause some shift in ridership from peak to off-peak, total ridership remained relatively level. A detailed analysis of the Dime Time experiment, prepared by Cervero, is included in Appendix D.

According to the Authority no detailed analysis has been conducted since the mid-70s on this issue and the MBTA does not regularly collect ridership or revenue data which differentiates peak vs. off-peak periods.

Commuter rail ridership figures, as discussed earlier, are maintained by train. According to the MBTA's 1985 Annual Report, almost 85% of commuter rail passengers travel during peak periods. In light of the high subsidies

received by commuter rail passengers relative to other service modes and the relative simplicity of schedules, etc., commuter rail might be the place to experiment with peak vs. off-peak fare adjustments.

In contrast to the Dime-Time program which reduced off-peak fares, consideration should be given to increasing peak fares and enhancing revenues. According to the 1983 Final Environmental Impact Report of the MBTA Fare Increase a peak period surcharge, which involves charging a premium for peak period trips, would take advantage of the low fare elasticities (discussion in Section Eleven) exhibited by regular commuters. Also, higher peak fares may encourage some MBTA patrons to travel off-peak where there is often greater capacity.

Systemwide peak pricing would most likely require automated fare collection equipment. This equipment would minimize problems associated with adjusting fares by time-of-day.

7.1.3 Experiences Nationwide

According to Cervero, implementing time-of-day pricing proved easier than anticipated for most transit agencies. The biggest problems occur at the fare changeover times at the beginning and end of each peak period. Nearly one-third of the transit agencies surveyed collect their fare differentials on the basis of certain runs or arrivals at some common activity center, rather than relying on the "hands of the clock." Run-based collections

virtually eliminates fare disputes, more closely approximates cost variations, and provides the flexibility needed to make differential pricing manageable.

Transit officials, according to Cervero, were enthusiastic about time-of-day pricing, but were fearful of public outcry. Many transit properties that have instituted time-of-day pricing provide only a small peak/off-peak fare differential to avoid alienating any transit constituencies. Plans to

widen the differential are sometimes forgotten, and the effective differential may be eroded over time by inflation.

Public acceptance of time-of-day pricing usually follows effective marketing campaigns. According to Cervero, the most useful marketing tool is the promotion of the off-peak fare as an "incentive" or "bargain" fare. Another tactic chosen was to emphasize the benefits of off-peak travel.

7.2 The Use of Distance-Based Fare Structures and Efficiency Considerations

As was stated earlier, "efficiency" requires that passengers pay fares to reflect the differentials in cost of service and benefits received. Passengers who consume more expensive service should generally pay higher fares, unless social benefits of modes vary substantially. This definition of efficiency suggests that higher fares be charged on more expensive transportation modes, and that within any mode the further a passenger travels the more he or she should be required to pay.

There are several practical ways of structuring a distance based fare system. The two most common approaches are the use of zones and the use of a system capable of measuring actual distance traveled by each passenger.

7.2.1 Commuter Rail

The MBTA's commuter rail network is already zoned, though conforming only loosely to mileage guidelines. Commuter rail provides zoned fares based both from the hub origins of North and South Stations and a separate lower interzone fare structure based on the number of zones traveled when origin or destination is not the Boston hub (see Appendix B and Table 12 on page 51).

To ensure that the relative zone fares on commuter rail are efficiently priced, an analysis needs to be made of the incremental cost of service to

additional zones. Such an analysis is beyond the scope of this study. In the absence of such an analysis, we shall focus on the overall level of fares.

The low fare recovery ratio for commuter rail and high per revenue mile costs (see Tables 2 and 5), together with crowded conditions indicating that demand exceeds capacity, strongly suggests that commuter rail fares are inefficiently low. An increase in fares, including possible restructuring of interzonal charges, is overdue.

7.2.2 Heavy Rail

Though nominally zoned, the MBTA's heavy rail lines (the Red, Orange and Blue Lines) offer the rider an essentially flat fare system that penalizes occasional riders who make short trips and favors the frequent, peak period passenger who commutes to the CBD from longer distances. At present Zone 2 encompasses only the Quincy Center Station on the Red Line, while Zone 3 includes just Quincy/Adams and Braintree. (See map on page 3, map on the following page and Table 10.) The rationale for charging more for using these stations is that they lie beyond the six-mile zone limit which is the benchmark against which subway pricing is allegedly measured. The official policy is that any station lying roughly six miles or more from a central subway transfer point lies outside Zone 1 and therefore should cost more to use.

7.2.2.1 An Example of MBTA Rapid Transit Distance Inequities

To illustrate the great variability in current per mile fares on rapid transit, suppose four passengers enter the Oak Grove Orange Line station. Each pays \$.60 to board an Orange Line train. One travels only to Malden Center, a distance of .8 miles. His cost per mile is \$.73. A second rider



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TABLE 10

RAPID TRANSIT ROUND TRIP COSTS

Station	Miles* Rd. Trip	Rd. Trip Fare (\$)	Total Cost/Mile	Pass	Monthly Pass Price	Pass Fare/ Mile	Pass Fare/Mile // Cash Fare/Mile
=====							
RED LINE							
(to Downtown Xing)							
Braintree	23.05	2.40	0.10	D	40.00	0.08	79%
Quincy Adams	19.33	2.40	0.12	D	40.00	0.10	79%
Quincy Center	16.68	1.80	0.11	C	36.00	0.10	95%
Wollaston	14.11	1.20	0.09	B	22.00	0.07	87%
North Quincy	12.52	1.20	0.10	B	22.00	0.08	87%
Ashmont	11.18	1.20	0.11	B	22.00	0.09	87%
Shawmut	9.93	1.20	0.12	B	22.00	0.11	87%
Fields Corner	8.78	1.20	0.14	B	22.00	0.12	87%
Savin Hill	6.78	1.20	0.18	B	22.00	0.15	87%
JFK/UMass	5.36	1.20	0.22	B	22.00	0.20	87%
Andrew	3.88	1.20	0.31	B	22.00	0.27	87%
Broadway	2.21	1.20	0.54	B	22.00	0.47	87%
South Station	0.53	1.20	2.25	B	22.00	1.96	87%

(to Park Street)							
Alewife	11.71	1.20	0.10	B	22.00	0.09	87%
Davis	9.91	1.20	0.12	B	22.00	0.11	87%
Porter	8.59	1.20	0.14	B	22.00	0.12	87%
Harvard	6.61	1.20	0.18	B	22.00	0.16	87%
Central	4.46	1.20	0.27	B	22.00	0.23	87%
Kendall	2.55	1.20	0.47	B	22.00	0.41	87%
Charles	1.11	1.20	1.08	B	22.00	0.94	87%

BLUE LINE							
(to State Street)							
Wonderland	11.17	1.20	0.11	B	22.00	0.09	87%
Revere Beach	10.38	1.20	0.12	B	22.00	0.10	87%
Beachmont	8.91	1.20	0.13	B	22.00	0.12	87%
Suffolk Downs	7.84	1.20	0.15	B	22.00	0.13	87%
Orient Heights	6.89	1.20	0.17	B	22.00	0.15	87%
Wood Island	4.73	1.20	0.25	B	22.00	0.22	87%
Airport	3.51	1.20	0.34	B	22.00	0.30	87%
Maverick	2.37	1.20	0.51	B	22.00	0.44	87%
Aquarium	0.56	1.20	2.15	B	22.00	1.88	87%
Government Center	0.36	1.20	3.37	B	22.00	2.94	87%
Bowdoin	0.67	1.20	1.78	B	22.00	1.55	87%

ORANGE LINE							
(to State Street)							
Oak Grove	12.06	1.20	0.10	B	22.00	0.09	87%
Malden Center	10.41	1.20	0.12	B	22.00	0.10	87%
Wellington	6.90	1.20	0.17	B	22.00	0.15	87%
Sullivan Square	4.52	1.20	0.27	B	22.00	0.23	87%
Community College	2.87	1.20	0.42	B	22.00	0.37	87%
North Station	1.24	1.20	0.96	B	22.00	0.84	87%
Haymarket	0.71	1.20	1.70	B	22.00	1.48	87%

(to Downtown Xing)							
Forest Hills	5.08	1.20	0.24	B	22.00	0.21	87%
Green	4.31	1.20	0.28	B	22.00	0.24	87%
Stony Brook	3.78	1.20	0.32	B	22.00	0.28	87%
Jackson Square	3.25	1.20	0.37	B	22.00	0.32	87%
Roxbury Crossing	2.66	1.20	0.45	B	22.00	0.39	87%
Ruggles	2.26	1.20	0.53	B	22.00	0.46	87%
Mass. Avenue	1.72	1.20	0.70	B	22.00	0.61	87%
Back Bay/South End	1.22	1.20	0.99	B	22.00	0.86	87%
NE Medical Center	0.64	1.20	1.87	B	22.00	1.63	87%
Chinatown	0.27	1.20	4.44	B	22.00	3.88	87%

RAPID TRANSIT ROUND TRIP COSTS

Station	Miles* Rd. Trip	Rd. Trip Fare (\$)	Total Cost/Mile	Pass	Monthly Pass Price	Pass Fare/ Mile***	Pass Fare/Mile // Cash Fare/Mile
=====							
GREEN LINE (to Park Street)							
Lechmere	3.78	1.20	0.32	B	22.00	0.28	87%
Science Park	2.64	1.20	0.46	B	22.00	0.40	87%
North Station	1.89	1.20	0.63	B	22.00	0.55	87%
Haymarket	1.23	1.20	0.98	B	22.00	0.95	87%
Government Center	0.65	1.20	1.86	B	22.00	1.62	87%
Boylston Street	0.45	1.20	2.67	B	22.00	2.33	87%
Arlington	1.20	1.20	1.00	B	22.00	0.88	87%
Copley	1.94	1.20	0.62	B	22.00	0.54	87%
Auditorium	2.93	1.20	0.41	B	22.00	0.36	87%
Kenmore	3.79	1.20	0.32	B	22.00	0.28	87%
Prudential	2.68	1.20	0.45	B	22.00	0.39	87%
Symphony	3.23	1.20	0.37	B	22.00	0.32	87%
Northeastern	3.84	1.35	0.35	B	22.00	0.27	78%
Brigham Circle	6.04	1.35	0.22	B	22.00	0.17	78%
Heath	7.41	1.35	0.18	B	22.00	0.14	78%
ARBORWAY	11.57	1.35	0.12	B	22.00	0.09	78%
BU Central	5.01	1.35	0.27	B	22.00	0.21	78%
Packard's Corner	6.80	1.35	0.20	B	22.00	0.15	78%
Harvard Ave	7.38	1.35	0.18	B	22.00	0.14	78%
Washington Street	9.19	1.35	0.15	B	22.00	0.11	78%
BOSTON COLLEGE "B"	12.16	1.35	0.11	B	22.00	0.09	78%
St. Mary s	5.09	1.35	0.27	B	22.00	0.21	78%
Coolidge Corner	6.67	1.35	0.20	B	22.00	0.16	78%
CLEVELAND CIR "C"	9.60	1.35	0.14	B	22.00	0.11	78%
Brookline Village	7.15	1.35	0.19	B	22.00	0.15	78%
Reservoir	10.59	1.35	0.13	B	22.00	0.10	78%
Chestnut Hill	12.67	2.10	0.17	C	36.00	0.14	82%
Eliot	18.71	2.10	0.11	C	36.00	0.09	82%
Waban	20.44	2.10	0.10	C	36.00	0.08	82%
Woodland	22.09	2.10	0.10	C	36.00	0.08	82%
RIVERSIDE "D"	23.95	2.10	0.09	C	36.00	0.07	82%

Average: 0.47

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* Assumes round trip to destination listed under Line

travels to State Street, a distance of 6 miles. His per mile cost is \$.10. The third rider travels to Kenmore Square, a distance of 8 miles. His per mile cost is \$.08. Finally, a fourth rider travels to Wollaston, a distance of 13 miles. His per mile cost is \$.05. Per mile, the first rider pays 16 times what the fourth rider pays. While this example is extreme, the flat-fare system promotes fare inequalities even for those peak period riders who travel only downtown and back. See Table 10 for a comprehensive summary of per mile fares on rapid transit.

7.2.3 Light Rail

The surface sections of the Green Line encompass two zones with only the Highlands Branch having any stops in Zone 2. Unlike commuter rail or rapid transit, there are no provisions for a one zone fare for those passengers who ride only within Zone 2. A detailed analysis of the unique fare issues on the Green Line is in Section Ten.

7.2.4 Bus

Currently the MBTA's bus service operates on a distance-based zone system (see Section One). As in the case with commuter rail, it is unclear whether the relative charge per zone efficiently reflects the relative costs and benefits of zone travel. An analysis to determine that is beyond the scope of this study.

In fact, the absence of complete and accurate data on bus revenue for the MBTA makes it very difficult to perform any meaningful analysis of the adequacy of current bus revenue to cover current bus expense. The inability of the current fare collection system to ascribe pass revenue to particular buses or runs and its inability to ascribe cash fares to particular routes are

major obstacles. A thorough review of bus fares and bus fare collection equipment is in order.

7.2.5 The Argument for Distance-Based Transit

There are a number of facts which are important to bear in mind when contemplating a distance-based fare system. Standard long distance commuter service is generally more costly than central city service because passenger demand is usually one-directional: most passengers travel into the city core in the a.m. peak and go from the city core to the suburb in the p.m. peak. This means that vehicles heading toward the city in the morning run at or over capacity while vehicles running in the opposite direction are virtually empty.

Passengers on different transit modes average varying distances for a transit trip. Weiss, et al. (1974) found that the average New York City bus passenger traveled two miles per trip while the average subway passenger traveled 7.2 miles per trip. These facts are crucial to decisions on length of possible zones or determination of incrementals for outlying zones.

7.2.6 Options

The key to implementing a strictly distance-based fare system is accurate fare collection equipment. The rapid transit systems in Toronto, San Francisco and Washington, DC - to name a few - currently use fare collection equipment which can "read" where a passenger entered the system and decide, upon his exiting, how much his or her trip costs. The amount is deducted from a prepaid fare card that has a dollar amount programmed into it. Transit operators and passengers on these systems claim it works extremely well and have few, if any, complaints. These systems operate most efficiently from a distance-based pricing standpoint because they are most able to fine tune fares to cover every origin-destination gradation.

In Boston, implementing such a system would require significant capital outlay and the retraining of a number of employees. In the best of all worlds a strict distance-based fare system offers the most equitable choice. Failing an overhaul of the Boston fare collection system, the Advisory Board can only make broad recommendations regarding improvements/modifications of the current zone system.

7.2.6.1 Expansion of Rapid Transit Zones 2 and 3

"Zones" 2 and 3 could be enlarged. According to the six-mile benchmark policy, North Quincy and Wollaston should be assigned Zone 2 status, as they were before rapid transit fares were raised to \$.75 in 1981. Documentation to explain the change (from Zone 2 to Zone 1 status) was unavailable from the T. North Quincy and Wollaston lie 6.26 and 7.06 miles from Washington Street station, respectively. In addition, the track from Andrew runs for over four miles until it crosses the Neponset River (the border between Boston and Quincy) and enters North Quincy. The stretch between these two stations forms both a geographic as well as a municipal boundary.

Consideration might be given to including a number of "end of the line" stations which are just over/under six miles from the nearest central subway transfer station.

TABLE 11

RAPID TRANSIT STATIONS NEAR SIX MILE BENCH-MARK

STATION	MILES FROM NEAREST C. S. TRANSFER STA.

Alewife	5.854 (Park Street)
Ashmont	5.588 (Washington Street)
Oak Grove	6.028 (State Street)
Wonderland	5.583 (State Street)

North Quincy	6.261 (Washington Street)
Wollaston	7.056 (Washington Street)

Although little ridership data exists, it appears that these stations are heavily used by both local residents and suburban passengers from further out to access the entire system. Fare increases in these locations would seem to least penalize lower income, transit dependent citizens from the MBTA area urban core. However, before making a change at any of these stations, site-specific issues, such as parking cost and availability, must be taken into consideration. Should concerns about fairness to short-distance riders arise, a warrant system similar to the one found on the South Shore branch of the Red Line could be easily implemented.

7.2.6.2 How the Warrant System Might Work

For example, if Oak Grove became a Zone 2 station, a passenger would pay two tokens to enter the station and would exit for free. To ameliorate the penalty imposed on those traveling one or two stops on the northern end of the Orange Line, the T might offer warrants. Passengers buy two tokens upon entering Oak Grove and request a warrant. Then, when they arrive at their local destination they redeem the warrant for one full fare. When they return to Oak Grove, they (like all passengers exiting Zone 2 stations) do not pay upon exiting. This is the system currently in operation along the South Shore segment of the Red Line. MBTA officials assert that this system works well there, so there is no reason to believe that its expanded usage would not prove equally successful.

Concerns:

Any changes in zoning for current stations must be evaluated for impact on traffic patterns and in conjunction with actual or possible parking availability.

Station usage can be severely affected by parking availability. For example, despite the higher Zone 3 fares and the large, higher fee parking lots at Braintree and Quincy/Adams, there is evidence that these two stations are operating far below service capacity because they are limited by the capacity of their parking lots. Similarly, riders who arrive at T stations by bus are to some extent "captive" riders in that their bus route determines which subway station they will patronize. Bus routing is a powerful tool to direct transit patterns.

7.2.6.3 Designate Any Future Rapid Transit Stations Zone 3

The MBTA is urged to designate any outlying rapid transit expansion station Zone 3, as the Braintree and Quincy/Adams stations currently are. While no transit agency charges its patrons what it costs to provide them with the trips they take, most transit operators' fares more accurately reflect their individual operating costs. Table 7 shows a list of fare recovery ratios (fare revenue divided by operating cost) for several North American transit agencies; the MBTA has one of the lowest ratios of any transit provider. Not surprisingly, the MBTA also has some of the lowest fares in the country. No other transit agency charges less than \$.75 for heavy rail service, and a \$.60 commuter rail fare is unheard of outside the Boston area.

TABLE 12

COMMUTER RAIL TRIP COSTS

	MILES*	FARE(\$) W/OUT PASS	FARE(\$) PER MILE	FARE** W/PASS	FARE PER MILE	TIME*** TAKEN (MINS)
<u>B PASS (\$22/MO) ZONE 1AA</u>						
BACK BAY	1.20	.60	.50	.52	.43	5
MORTON STREET	5.27	.60	.11	.52	.10	10
UPHAMS CORNER	2.36	.60	.25	.52	.22	7
<u>B PASS (\$22/MO) ZONE 1A</u>						
CHELSEA	8.00	.75	.09	.52	.07	13
FOREST HILLS	5.15	.75	.15	.52	.10	12
MALDEN CENTER	4.50	.75	.17	.52	.12	11
PORTER SQUARE	3.50	.75	.21	.52	.15	10
W. ROXBURY	8.05	.75	.09	.52	.06	25
WEST MEDFORD	6.50	.75	.12	.52	.08	10
<u>D PASS (\$40/MO) ZONE 1</u>						
BELLEVUE	7.19	1.25	.17	.95	.13	20
BELMONT CENTER	6.50	1.25	.19	.95	.15	16
FAIRMOUNT	7.00	1.25	.18	.95	.14	12
HIGHLAND	7.65	1.25	.16	.95	.12	22
MELROSE HIGHLANDS	7.25	1.25	.17	.95	.13	17
MELROSE CEDAR PARK	6.50	1.25	.19	.95	.15	15
NEWTONVILLE	8.00	1.25	.16	.95	.12	19
ROSLINDALE	6.43	1.25	.19	.95	.15	16
WAVERLY	7.50	1.25	.17	.95	.13	19
WEDGEMERE	8.00	1.25	.16	.95	.12	14
WINCHESTER CENTER	8.50	1.25	.15	.95	.11	16
WYOMING HILL	6.00	1.25	.21	.95	.16	13
<u>E PASS (\$48/MO) ZONE 2</u>						
AUBURNDALE	10.50	1.50	.14	1.14	.11	24
BRANDEIS-ROBERTS	11.50	1.50	.13	1.14	.10	27
CENTRAL SQUARE-LYNN	9.50	1.50	.16	1.14	.12	23
ENDICOTT	10.00	1.50	.15	1.14	.11	18
GREENWOOD	8.25	1.50	.18	1.14	.14	19
HERSEY	11.04	1.50	.14	1.14	.10	30
MISHAWUM PARK	12.75	1.50	.12	1.14	.09	21
NEEDHAM JUNCTION	12.04	1.50	.12	1.14	.09	30
NEEDHAM CENTER	12.72	1.50	.12	1.14	.09	36
NEEDHAM HEIGHTS	13.62	1.50	.11	1.14	.08	40
READING	11.50	1.50	.13	1.14	.10	29
READVILLE	9.00	1.50	.17	1.14	.13	14

ROUTE 128	11.75	1.50	.13	1.14	.10	22
WALTHAM	10.00	1.50	.15	1.14	.11	24
WAKEFIELD	9.50	1.50	.16	1.14	.12	23
WEST NEWTON	9.00	1.50	.17	1.14	.13	19

F PASS (\$56/MO) ZONE 3

CANTON CENTER	16.00	1.75	.11	1.33	.08	26
CANTON JUNCTION	15.00	1.75	.12	1.33	.09	23
HASTINGS	13.25	1.75	.13	1.33	.10	32
ISLINGTON	13.00	1.75	.13	1.33	.10	21
KENDALL GREEN	12.50	1.75	.14	1.33	.11	31
NORTH WILMINGTON	13.50	1.75	.13	1.33	.10	37
NORWOOD CENTRAL	15.00	1.75	.12	1.33	.09	27
NORWOOD DEPOT	14.50	1.75	.12	1.33	.09	24
SALEM	16.25	1.75	.11	1.33	.08	32
SILVERHILL	14.70	1.75	.12	1.33	.09	35
SWAMPSCOTT	12.80	1.75	.14	1.33	.10	28
WELLESLEY FARMS	12.50	1.75	.14	1.33	.10	27
WELLESLEY HILLS	13.50	1.75	.13	1.33	.11	31
WELLESLEY SQUARE	14.50	1.75	.12	1.33	.09	35
WILMINGTON	15.00	1.75	.12	1.33	.10	27

G PASS (\$65/MO) ZONE 4

BALLARDVILLE	20.25	2.00	.10	1.55	.08	44
BEVERLY DEPOT	18.25	2.00	.11	1.55	.08	37
LINCOLN	16.75	2.00	.12	1.55	.09	37
MONTSERRAT	16.25	2.00	.12	1.55	.10	41
NATICK	17.50	2.00	.11	1.55	.09	40
PLIMPTONVILLE	17.70	2.00	.11	1.55	.09	35
SHARON	18.50	2.00	.11	1.55	.08	28
WALPOLE	19.50	2.00	.10	1.55	.08	37
WEST NATICK	19.00	2.00	.11	1.55	.08	45
WINSOR GARDENS	17.50	2.00	.11	1.55	.09	32

H PASS (\$74/MO) ZONE 5

ANDOVER	23.00	2.25	.10	1.76	.08	49
BEVERLY FARMS	22.00	2.25	.10	1.76	.08	37
CONCORD	20.00	2.25	.11	1.76	.09	43
FRAMINGHAM	21.50	2.25	.10	1.76	.08	50
HAMILTON-WENHAM	19.00	2.25	.12	1.76	.09	72
NORFOLK	23.00	2.25	.10	1.76	.08	43
NORTH BEVERLY	20.50	2.25	.11	1.76	.09	68
NORTH BILLERICA	23.50	2.25	.10	1.76	.07	36
PRIDES CROSSING	22.20	2.25	.10	1.76	.08	39
WEST CONCORD	21.25	2.25	.11	1.76	.08	47

J PASS (\$79/MO) ZONE 6

FRANKLIN	27.75	2.50	.09	1.88	.07	49
IPSWICH	23.25	2.50	.11	1.88	.08	81
LAWRENCE	26.50	2.50	.09	1.88	.07	54

LOWELL	27.00	2.50	.09	1.88	.07	45
MANCHESTER	24.00	2.50	.10	1.88	.08	53
MANSFIELD	25.00	2.50	.10	1.88	.08	36
SOUTH ACTON	25.00	2.50	.10	1.88	.08	52

K PASS (\$84/MO) ZONE 7

ATTLEBORO	32.00	2.75	.09	2.00	.06	45
BRADFORD	33.00	2.75	.08	2.00	.06	65
GLOUCESTER	31.50	2.75	.09	2.00	.06	65
HAVERHILL	33.25	2.75	.08	2.00	.06	67
LITTLETON	30.00	2.75	.09	2.00	.07	60
WEST GLOUCESTER	29.60	2.75	.09	2.00	.07	60

L PASS (\$89/MO) ZONE 8

AYER	36.50	3.00	.08	2.12	.06	69
SHIRLEY	38.50	3.00	.08	2.12	.06	75
ROCKPORT	35.00	3.00	.09	2.12	.06	73

M PASS (\$94/MO) ZONE 9

FITCHBURG	49.50	3.50	.07	2.24	.05	82
NORTH LEOMINSTER	43.50	3.50	.08	2.24	.05	75

*Destination is either North or South Station (excluding Midlands Branch - destination Back Bay). **Assumed 21 round trips per month, or 42 trips.
 ***Roughly estimated from rail time tables, assuming 100% on-time performance.

SECTION 8 - TRANSFER ISSUES

8.1 Overview

Ideally, every passenger who rides mass transit would travel directly from origin to destination aboard a single vehicle. However, it is impossible for transit agencies to provide such service, and passengers are often required to use two (or more) vehicles to make one trip. Transit agencies, in response, formulate transfer policies to manage vehicle routing, facilities and transfer charges, if any.

Reviewing what is done in other cities with large multi-modal transit systems is a useful first step in determining what the MBTA might want to look at in its transfer policy and where changes might be made.

Transfer charges can be anywhere from no charge to full fare. In most systems transfer from one subway vehicle to another is free. This is the case with the MBTA, although at several stations there is no "free transfer" which enables the rider to get off the vehicle and change direction. These stations are:

Red:	Central, Kendall, Ashmont
Orange:	None
Blue:	Wonderland
Green:	Boylston, Copley, Symphony

It is also common for different groups of passengers to pay different fares (for example, the elderly) and they may also pay different transfer charges. Some systems, like Boston, have a full fare transfer "policy" from rail to bus and bus to bus, but this is rare among transit operators, especially large ones. The American Public Transit Association (APTA) "Transit Fare Summary" dated February 1, 1987, reveals that of 302 reporting agencies, 174 (57.6%) have a free transfer policy (see Table 3). Free transfer agencies are usually single mode (bus) operations. The remaining 128

systems either charge a variety of transfer fees (\$.05 to \$.25 between modes) or do not have/did not report their transfer policy. All Canadian transit systems reporting to APTA have a free transfer policy. Table 13 summarizes the base fares and transfer charges of some large, multi-modal domestic transit agencies. It is important to know both base fares and transfer charges when comparing trip costs in order to get an accurate picture of what linked trips actually cost the consumer. Fares on MBTA's buses and rapid transit are among the lowest (if not the lowest) in the country. However, most other systems have a more extensive reduced or free transfer policy.

A number of factors determine the transfer policy chosen by operators. According to the Charles River Associates UMTA study State of the Art of Current Practices for Transit Transfers (July 1981) they are, in order of importance:

- o Historical/Institutional/Political
- o Revenue
- o Abuse
- o Equity

8.2 MBTA Transfer "Policy"

As discussed in Section 2, from 1946 to 1964 metropolitan Boston commuters were served by the MTA, which was composed of 14 core cities and towns. Fares were based on a flat systemwide fare with free transfers between modes and discounts for short local rides. Except for the Riverside line (Highland Branch) the fare structure remained as a flat fare system until the demise of the MTA. In the 1961 MTA Annual Report no explanation was given of the decision to end the free transfer policy. Ironically, "system fares" (one fare good for all modes of travel anywhere in the system) were pioneered in

TABLE 13

U. S. TRANSIT AGENCIES
TRANSFER CHARGES

Agency	Rail Bus Base Fare	Bus/Bus	Bus/Rail	Rail/Bus	Other/Comments
WMATA/Washington	\$0.80 \$0.75	\$0.00	\$0.80	\$0.00	Off-peak fares
CTA/Chicago	\$1.00 \$0.90	\$0.10	\$0.25	\$0.10	
MTA/Maryland	\$0.90 \$0.75	\$0.10	\$0.10	\$0.10	Third mode free
SEMTA/Detroit	\$1.00 \$1.00	\$0.10	\$1.00	\$1.00	'People Mover' rail for subway
NYCTA/New York	\$1.00 \$1.00	\$1.00	\$1.00	\$1.00	Free at 5 designated transfer points
GRCTA/Cleveland	\$1.00 \$0.85	\$0.00	\$0.15	\$0.00	
Port Auth/Allegheny County/Pittsburgh	\$1.00 \$1.00	\$0.25	\$0.25	\$0.25	
SEPTA/Philadelphia	\$1.25 \$1.25	\$0.25	\$0.25	\$0.25	
BART/San Francisco	\$0.80	\$0.00	\$0.80	\$0.60	
MUNI/San Francisco	\$0.75				
Average: Rail Bus	\$0.99 \$0.94	\$0.20	\$0.51	\$0.37	
MBTA/Boston	\$0.60 \$0.50	\$0.50	\$0.60	\$0.50	

Source: Telephone conversations with transit managers;
APTA Transit Fare Summary, February 1, 1987

Boston and are still in use in most American cities. In 1964 when the Legislature expanded the operations of the MTA and created the MBTA, the full-fare transfer practice was retained. The MBTA maintains an "official" full-fare transfer policy to this day, although exceptions exist and will be discussed later.

The T is in part correct when it claims that a full-fare transfer policy provides the Authority with an easily implemented distance-based fare structure. The sentiment is that those passengers who ride one mode and then transfer to a second mode are riding further on the system than single-mode users. However, there are numerous instances where this is not the case. For example, residents of the Davis Square section in western Somerville can walk to the Davis Square Red Line subway station and pay \$.60 for a five mile ride downtown. However, central Somerville residents who live by City Hall must pay \$1.10 to take a bus and subway to go downtown, even though geographically they live closer to the Boston Central Business District. The same holds true for those who live in the Southwest Corridor along the old Elevated Orange Line who find they must now take a bus to reach the new Orange Line. Even though most Washington Street residents live closer to the Boston CBD than most residents of the Orange Line section of Jamaica Plain, they must pay almost double (\$1.10 compared to \$.60) to reach downtown. In a radial, essentially flat fare system like Boston's, those who live along subway and commuter rail lines pay less for transit than those who may live closer to downtown but not within walking distance to a fixed rail mode.

According to the 1978 Systemwide Passenger Survey prepared by CTPS (the last time such data was collected by the MBTA), 29% of MBTA patrons use rapid transit only, 31% use surface only and 40% combine modes to arrive at their destinations. Since no data has been collected since that survey, T officials

assume that these proportions are still valid. The T's Service Planning Department recently estimated that between 10 and 25% of bus patrons transfer from one bus to another.

In defending its full-fare transfer policy, the T cites: a) historical precedent, b) fear of revenue erosion, c) fear of transfer abuse, and d) substantial implementation costs as justification for maintaining the status quo. While these concerns are valid, the MBTA appears to overstate its case against changing its transfer policy, and clearly applies its transfer policy inconsistently. A review of the T's arguments is illuminating.

8.3 Historical Precedent

As mentioned above, free transfers were a feature of Boston's mass transit system up until 1961. Passengers who wished to transfer from bus to rapid transit, bus to bus, or rapid transit to bus were issued a paper transfer slip upon boarding which was valid for entering the second (or third) vehicle. The abolition of the free transfer in 1961 meant a doubling or tripling of fares for many MTA patrons, who typically used more than one MTA vehicle per trip. While revenues did increase following this policy decision, it has been argued that the free transfer elimination caused part or most of the ridership decline experienced by the Authority in the early 1960s.

The T counters that the introduction of monthly T passes in the mid-70s mitigated the need for free transfers. Regular users of the system may buy an A pass, valid for bus use; a B pass, for use on most parts of the subway and the subway portion of the Green Line; or a C pass, which grants unlimited access to most bus and subway destinations. (The Green Line past Reservoir and the Red Line past Quincy Center require a D pass.) In essence, the T claim, use of a C pass is the intermodal transfer mechanism in Boston. In

fact, the price of the C pass is adjusted to reflect a combination bus and subway fare. Unfortunately, passes which necessitate a significant monthly outlay of cash are not practically available to low income transit dependent riders.

TABLE 14

MBTA PASSES A - C COMPARATIVE COSTS

PASS	PRICE/ MONTH (\$)	VALID	ONE-WAY FARE (\$)	PASS COST/ CASH TRIPS (Break-even Point)
A	18	Most local buses	\$.50	36
B	22	Subway excl. Green Line above-ground and Red Line Zone 2 & 3	\$.60	36.7
C	36	Bus and Subway as above, some Com. Bus	\$1.10	32.7

Even with a monthly pass it still costs about twice as much to transfer from one transit mode to another. (It is interesting to note that holders of more expensive passes than C are granted these same travel privileges without a price adjustment which reflects intermodal usage. For example, every pass valid for commuter rail is also good for the above travel options.)

Passengers who benefit most by the pass program are those whose trips involve the use of two or more buses. Passengers who travel by bus to the subway or vice versa (estimated by the T in the 1978 Systemwide Passenger Survey to be 40% of the ridership) pay the most. See the following subsection for a further discussion of the pass program.

8.4 Revenue Erosion

The T is rightly concerned that a discounted or free transfer policy would probably cause loss of revenue. However, predicting the extent of revenue erosion is difficult. As discussed earlier in Section Six, the MBTA collects very little information about its ridership and their riding habits. Without such information it is difficult to predict how ridership patterns would change if fares (or transfer charges) increased or decreased. Little research in transit circles has been done to study the effects of transfer policy changes on ridership and revenue (and, according to the T, none related to the MBTA has been done formally in the last 20 years).

It is interesting to note that the Washington, D.C., transit agency (WMATA) has a free rail-to-bus transfer policy but a full fare bus-to-rail policy. They find that 17% more people will transfer from rail to bus than transfer from bus to rail. This suggests that there is a population of "marginal transferees," whose transfer patterns are determined not by trip demands but by transfer cost. They will accept a transfer when one is offered for free but will find alternate means of transportation instead of paying to transfer to a bus.

8.5 Abuse...The MBTA Experience

The MBTA has all but eliminated transfer abuse by retaining an almost exclusively full-fare transfer policy. They have done this at the expense of multi-vehicle riders who, as previously pointed out, pay much more per trip than single-mode users. No estimate of transfer abuse from the MTA free transfer period is available. The Charles River study claims that when Philadelphia had a free transfer charge "there was a thriving black market in transfers." WMATA officials in Washington claim there is very little abuse of their system. The Charles River authors conclude that:

operators who perceive transfer abuse as important all come from properties with a nonzero transfer charge. Systems with no transfer charge may be unaware of or choose to ignore whatever transfer abuse does occur.

In theory, therefore, the MBTA is holding the line against transfer abuse by charging full fare to switch vehicles. In practice, when the Authority does issue transfers, the question of abuse never arises. In fact, when questioned, T officials maintain that very little abuse occurs with the limited transfers which now exist.

8.6 Where the MBTA Issues Transfers

The MBTA has consistently offered free transfers to passengers traveling from the Ashmont station on the Red Line to the Mattapan High Speed Line, and vice versa. The T also issues free transfers on an ad hoc basis when track reconstruction requires subway replacement with buses for part of a trip. For example, the T currently allows Jamaica Plain residents who use the "E" line to take a Green Line train from Boston to Brigham Circle and then board a bus (for free) to continue the rest of their journey. Similarly, during Red Line reconstruction, buses replaced trains from Kendall to South Station when track work was in progress. In all probability, little abuse occurs, but there is no hard evidence from the T.

Advisory Board staff have noticed a serious lack of concern for transfer abuse during track reconstruction periods. For example, when buses were shuttling Red Line passengers from Harvard Square to Park Street, few paper transfers were given out at either subway station. Riders boarded buses en masse, without paying and without surrendering any paper transfers. Then, as the buses made stops at Kendall and Central Square, on Massachusetts Avenue, fares were seldom requested from boarding passengers. Passengers boarding between Harvard and Park Street either walked or rode buses to this origin

point. From there they rode the replacement bus service for free. During the Red Line reconstruction from South Station to Kendall, passengers from the Orange Line who wished to transfer to the Red Line disembarked at Washington Street, were not offered transfers (and at times were not given them if requested), walked up Winter Street and boarded buses on Tremont Street. Again, no fares were paid and no transfer slips were issued or requested.

Riders of the Mattapan High Speed Line are also able to transfer to the MBTA's Red Line free of charge at Ashmont station. Retention of this free transfer was specifically recommended by MBTA General Manager James O'Leary (in a memo to the T Board of Directors dated February 2, 1982) during the last "fare adjustment."

Free transfers are also currently issued to passengers who used to ride the Elevated Orange Line. After relocation, many people who previously could walk to the Orange Line found they had to ride a bus and then board the new Orange Line at a considerable distance from their previous originating station. Their fares were almost doubled. Considerable pressure was brought to bear on the T to accomodate these riders, and an eleventh hour policy was announced whereby certain riders along certain sections of the Orange Line are allowed to transfer free from bus routes 8, 15, 19, 23, 28, 29, 42, 44 and 45 at Dudley to the Ruggles Street Orange Line station in the morning and from the Orange Line to these same buses in the afternoon.

The issuance of free transfers to certain Orange Line riders is commendable from a "fairness" standpoint but dangerous in other, important ways. For example, the Green Line's "A" line service was "temporarily" replaced with bus service more than 18 years ago. Residents of Watertown, parts of Newton, and Brighton used to take one "A" line trolley where now they take the 57 bus and then transfer at Kenmore for a trip downtown. No free

transfer scheme was offered to them. The realignment of the northern end of the Orange Line (when the end station was changed from Edward Everett Square to Oak Grove) similarly was accompanied by no transfer policy adjustment. In tampering with revenue-producing policies the T has opened itself up to myriad complaints of unequal treatment.

8.7 Implementation Costs

It is difficult to estimate the costs that would be associated with implementing a comprehensive (systemwide, not mode-specific) transfer policy at the MBTA. According to the Charles River Associates study, prepared in 1981, the MBTA

several years ago estimated the cost of issuing free transfers on buses to bus riders transferring to the subway, who then transferred to other buses.

They estimated the cost (not counting revenue loss) to be about \$1 million per year. The T estimated the cost of the transfers alone to be \$100,000. Although the study unfortunately does not explain the T's methodology in detail, it explains that most of the cost would be attributable to the ten minute turn-in time allowed each driver at the end of his shift, along with the extra labor it would take to administer and issue the transfers. These costs are higher than estimates cited by other transit agencies.

On the other hand, the authors of the Charles River Associates study found that revenues from non-zero-based transfers were as high as \$800,000 per year with only a \$.05 transfer charge.

The equipment associated with transfers is simple and relatively inexpensive. Most transit authorities have their bus operators hand out transfers to those passengers requiring them when the passenger boards. The

extra dwell time associated with this procedure is negligible. Rail systems most often offer transfers through the use of a machine placed in the rail station beyond the fare collection equipment that guards the entrance. Most of these transfer issuing machines either automatically dispense paper transfers (like taking a number at a bakery or deli) or require a patron to push a button which then causes the machine to eject a transfer. These transfers are normally marked with the date, time and place of issuance, which aids in preventing abuse by identifying where and when they were issued.

Not enough data exists from the T to accurately predict what such a transfer operation might cost if applied to the entire MBTA system. However, since a free transfer policy now exists for those transferring from the Mattapan High Speed Line to the Red Line at Ashmont station, it should be relatively easy for T officials to calculate the costs related to that situation and extrapolate for the system as a whole.

8.8 Conclusions

The T's current transfer policy does not meet the needs of riders least able to pay and most dependent on public transit. In addition, there are so many temporary or politically expedient exceptions that the implementation of the "policy" is rife with inequities. A thorough review of the actual transfer system at the T is in order with subsequent modification. That modification should take account of the following observations:

- o the bus to bus travel patterns of low-income transit dependent riders;
- o use of monthly passes as the transfer mechanism (other than for heavy rail) for a system is regressive;

- o free transfers appear to be less problematic than reduced price transfers;
- o the WMATA experience suggests transfers can attract significant new ridership.

SECTION 9 - THE MBTA PASS PROGRAM

9.1 Overview

In 1974 the MBTA introduced paper "flash" passes and pioneered the concept of pre-paying transit fares. For a monthly fee, workers were able to purchase these passes from their employers and were allowed unlimited access to certain MBTA transit services, depending upon the pass purchased. These passes were "flashed" at bus operators and subway gatemen, who allowed passengers to board vehicles and enter stations. In 1980 the Authority purchased electronic passreaders and introduced plastic encoded passes.

The Pass Program was introduced to encourage ridership by increasing convenience of system use. The Pass Program also eases fare collection by the Authority and provides up-front funds that can be invested by the T. Since its inception, the Pass Program has expanded rapidly. There are currently 13 different passes offered at 39 sales locations. In addition, more than 700 firms and agencies (including the Commonwealth of Massachusetts) in the Greater Boston area participate in the Employer Pass Program by selling passes to their employees for cash or through payroll deductions. Over 80 of these companies offer employees fully or partially subsidized monthly passes. Two other small scale, but promising, pass options are the Annual Pass program and the Pass By Mail program. By 1987, only 11 people had subscribed to the annual pass, while between 700 and 800 passengers elect to purchase their monthly pass through the mail. Between 110,000 and 120,000 total passes are sold each month.

TABLE 15

MBTA PASS SALES BY CATEGORY
(Passes A -F)

Pass Type	Monthly Cost	FY87	% Total Sold	FY86	% Change FY87/FY86
A	\$18	195,790	15.62%	198,914	-1.57%
B	\$22	545,298	43.50%	515,746	5.73%
C	\$36	372,635	29.73%	348,417	6.95%
D	\$40	58,266	4.65%	55,085	5.77%
E	\$48	62,580	4.99%	59,968	4.36%
F	\$56	19,023	1.52%	16,578	14.75%
Total		1,253,592	100%	1,194,708	4.93%

9.2 Pass Options - Surface and Rapid Transit

Most of the service offered directly by the T is covered by passes A through C. It is interesting to note that in FY87 89% of A - F passholders purchased A - C passes. Because the MBTA fare structure contains a number of "special cases", a copy of the Pass Program brochure (Appendix F) is attached to help clarify which pass is used on which mode (and, as in the Green and Red Lines, which segments of which mode.)

According to the T's published pass information, transit riders who only patronize buses or the surface portion of the Green Line would buy an A pass (except for the Riverside branch west of Chestnut Hill.) Those who use the subway (and subway portion of the Green Line, but not the Red Line beyond Wollaston) exclusively would purchase the B pass. Those who use a combination of these modes or a \$1.00 express bus would require a C pass. Note that this is the T's official written pass policy but this has been observed to vary significantly in practice. Assuming for simplicity that passes A through C are used to buy rides only on local Zone 1 buses (85% of bus routes are one zone) and/or in the Central Subway, the following fare schedule and "pass price ratio" would apply. This ratio, pass price/round-trip fare, can be

thought of as the break-even point for each pass; after this point any additional trips made can be considered free.

TABLE 16

PASS PROGRAM (A-C) "BREAK-EVEN" POINT

Pass	Price	Valid Mode	Round Trip Cash Fare	Number of Round Trips to "Break-even"
A	\$18.00	Bus (Zone 1)	\$1.00	18.00
B	\$22.00	Subway (Zone 1)	\$1.20	18.33
C	\$36.00	Both (Plus Some Express Buses)	\$2.20	16.36

MBTA passes D, E and F have varied uses. These passes are valid for traveling on segments of rapid transit (Zone 3), commuter rail (Zones 1, 2 and 3), and certain express bus routes. A comparison showing these pass prices in terms of round trip fares is difficult to construct because of the lack of pass user information collected by the T. These passes replace a number of different cash fares, and it is unclear how passholders use their passes.

9.3 Pass Options - Commuter Rail

Of the 13 monthly passes offered by the MBTA, ten (D - P) may be used on different portions of Boston's commuter rail network. Appendix E shows passes sold by category. In October 1987, commuter rail fares were lowered at nine stops near the Boston CBD. Although these stops now require only a B or C pass, B and C passes are still used predominantly on other forms of service delivered directly by the T. Passes D - P are listed below by letter designation and by commuter rail zone for which they may be used. Each zone's round-trip cash fare is included, along with the monthly pass price divided by the applicable round-trip cash fare "break-even" point.

TABLE 17

PASS PROGRAM (D-P) "BREAK-EVEN POINT"

MBTA Pass	Zone	Monthly Price	R.T. Cash Fare	Number of Trips to "Break-even"
D	1	\$ 40.00	\$2.50	16
E	2	\$ 48.00	\$3.00	16
F	3	\$ 56.00	\$3.50	16
G	4	\$ 65.00	\$4.00	16.25
H	5	\$ 74.00	\$4.50	16.44
J	6	\$ 79.00	\$5.00	15.8
K	7	\$ 84.00	\$5.50	15.27
L	8	\$ 89.00	\$6.00	14.83
M	9	\$ 94.00	\$7.00	13.42
P	11	\$104.00	\$9.00	11.5

Although there is no standard pass price policy against which pass price decisions are judged, the rule of thumb for commuter rail seems to be that a monthly pass should cost the same as 15 or 16 round trips. Interestingly, the price per round trip fare crests at Zone 5 and decreases markedly to 13.42 round trips by Zone 9, which encompasses Fitchburg and North Leominster (currently there are no Zone 11 stations). If one assumes that commuter rail riders use their passes for 21 round trips per month, the fare per mile for Pass M holder traveling to North Leominster is \$.05 compared to the \$.11 per mile paid by Pass F holder traveling to Kendall Green (see Table 12).

Commuter rail in theory consists of "premium" service (generally defined as limited stop express service along protected rights of way) to outlying metropolitan communities. Such service should command premium prices. Commuter rail service is also the most expensive form of public transportation in the T district to provide on a per revenue mile or per passenger basis; in FY86, the estimated subsidy (net cost per passenger) on commuter rail was \$4.58; the estimated subsidy per passenger on direct T service was \$2.00. (See Table 5.) Not only do cash fares for commuter rail cover a lower proportion of costs incurred, but commuter rail pass prices relative to cash fares are

set lower than local service passes (see Tables 16 and 17). There is no justification for such a practice.

9.4 Benefits of Monthly Passes

The benefits of purchasing a monthly pass to the consumer are many. Passholders who are frequent T riders gain unlimited access to their pass mode(s), so the passes pay for themselves after a relatively short period. The "subway pass" has the highest pass price/cash fare ratio, but even it becomes cost effective after just 18 round trips. In addition, passes are convenient to use in that passengers are not required to stand in token lines or piece together the exact change (in coin) for a \$1.50 ride. There are also some cash discounts offered passholders, such as reduced admissions to popular tourist sites and a 10% reduction in comprehensive automobile insurance (for eleven monthly passes per calendar year). In addition, guests may travel free on Sunday with a passholder.

Pass use benefits the Authority in that it simplifies the cash collection and accounting process and provides advance revenue at a specific time every month. In FY87 pass revenue accounted for roughly 33% of total fare revenue. By having 33% of its revenue provided at the beginning of every month, the Authority's cash-flow and investment possibilities are considerably enhanced.

Use of encoded passes has the potential to help the Authority collect meaningful ridership data, but as yet little is being done in this area. In fact, as passes have become more popular ridership data has become harder to pinpoint because it is more difficult for the Authority to track the travel patterns of its passholders as compared to the habits of the cash-fare paying public. Passreaders (when working at all) currently do not distinguish between types of passes, for example, and allowing passengers to enter the

TABLE 18

COMPARISON OF NATIONWIDE TRANSIT PASS PROGRAMS

System	Mode	Base Fare	Monthly Pass Price	# One-Way Cash Trips
Atlanta*	Heavy	\$0.60	\$25.00	41.67
Boston	Heavy	\$0.60	\$22.00	36.67
	Bus	\$0.50	\$18.00	36.00
Chicago	Heavy	\$1.00	\$46.00	46.00
	Bus	\$0.90	\$40.00	44.44
Cleveland	Heavy	\$1.00	\$40.00	40.00
	Bus	\$0.85	\$34.00	40.00
Detroit	Bus	\$1.00	\$48.00	48.00
Houston	Bus	\$0.60	\$25.00	41.67
LA/Long Beach	Heavy	\$0.85	\$32.00	37.65
	Bus	\$0.60	\$25.00	41.67
Miami	Heavy	\$1.00	\$40.00	40.00
	Bus	\$0.75	\$40.00	53.33
San Francisco	Heavy	\$0.80	\$23.00	28.75
	Bus	\$0.75	\$23.00	30.67
Average:	Heavy	\$0.84	\$32.07	40.43
	Bus	\$0.72		

*Atlanta recently raised its base heavy rail fare to \$.75.

SOURCE: APTA Transit Fare Summary, February 1, 1987
Conversations with Transit Officials.

station by "flashing" their passes at collectors loses these riders to the fare collection (and passenger counting) equipment. In addition, there is no mechanism to record pass use on bus, trackless trolley or surface portions of the Green Line. According to Public Affairs (memo from Timothy Gens, Director of Public Affairs, to MBTA Advisory Board, August 19, 1986),

"the passreaders in Rapid Transit stations could potentially record the percentage of riders who enter the system by token and by pass, enabling the MBTA to track where passholders are entering the system. Plans are underway to enhance their capabilities so that detailed ridership and revenue reports will be possible."

9.5 Other Pass Program Issues

9.5.1 North American Comparison

Table 18 shows how the MBTA's monthly pass pricing structure compares with similar transit properties in North America. The biggest transit agencies, like Boston, have complex pass use and pricing schemes, so only those systems where reasonable comparisons could be made to the Boston system were chosen. (Source: APTA Transit Fare Summary; February 1, 1987.)

According to the table, the MBTA monthly A and B passes are slightly less expensive in terms of one-way trips than average. It is interesting to note how much less expensive Boston's base cash fares and cash pass prices are relative to other transit providers.

9.5.2. Other Pass Options

9.5.2.1. Convention Passes

In 1984 the MBTA began offering limited use passes to attendees of conventions and trade shows held in Boston. For \$3 to \$6 (depending on the length of the convention) visitors could enjoy unlimited access to local bus

and the central subway. Although begun with much fanfare, the program has been inactive for several years and there has been very little information available on the planning or cost of this program.

9.5.2.2. Improvements in the Annual Pass

Public Affairs is considering making two improvements to the Annual Pass program. First, the current pricing system offers no cash discount to the user (an annual B pass costs 12 times as much as a monthly B pass.) Therefore, the Pass Program would like to offer a 5 - 10% cash discount to the price of an annual pass. Recognizing that passengers would probably require some cash incentive to pay an annual transit fare upfront, this discount makes sense.

Second, Public Affairs states that the MBTA is "looking into expanding the capabilities of its passreader equipment to make an annual pass feasible." Currently, the 11 annual pass "holders" are mailed a new pass every month.

9.5.2.3. Pro-rated Pass Sales

The Authority is considering the feasibility of offering pro-rated "monthly" passes to riders during the month. Currently passes are only available for six working days every month. Passes would need to be discounted daily if such a plan were to work. The administrative costs and the managerial problem of such a scheme are unclear and may preclude implementation.

9.6 Conclusions

Although it is difficult to recommend specific changes in the Pass Program because of the scarcity of even rudimentary figures on pass use within

categories and overall passenger travel and usage patterns, some firm conclusions are warranted.

1. An overhaul of the T's fare structure should ideally precede major changes in the Pass Program.

2. There is no rationale for commuter rail passes breaking even at fewer round trips than A through C passes.

3. The total systemwide access allowed by commuter rail passes should be factored into the pass price or be restricted.

4. The significant discrepancies observed between published uses of passes A through C and actual practice should be addressed.

5. The complex list of apparently arbitrary exceptions to the use of A through E passes should be modified and/or eliminated.

SECTION 10 - MAJOR INEQUITIES IN THE CURRENT MBTA FARE STRUCTURE

10.1 Green Line Inequities

10.1.1 Background

The MBTA's Green Line fare structure suggests that the light rail branches operate as two separate services. At all central subway Green Line locations a passenger pays \$.60 to enter. On the surface portions of the Green Line the fare is \$.75 per zone. See Map 4 on the next page for a depiction of current Green Line service.

In 1978 the T instituted a "Getaway Plan" on the Highland (Riverside) Branch from Fenway to Riverside which eliminated surface fares in the outbound direction. In 1980 this plan was expanded to all routes west of Kenmore and south of Symphony (all surface service). Because all three doors may now be used in the outbound direction, this plan speeds service during peak hours. The Getaway Plan seems to benefit all Green Line riders save those traveling on the Newton section of the Riverside Line. Because the T maintains they cannot distinguish between local and long-distance riders on the Riverside Line, Newton passengers pay \$1.50 regardless of distance traveled.

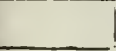
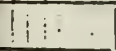
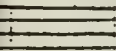
TABLE 19

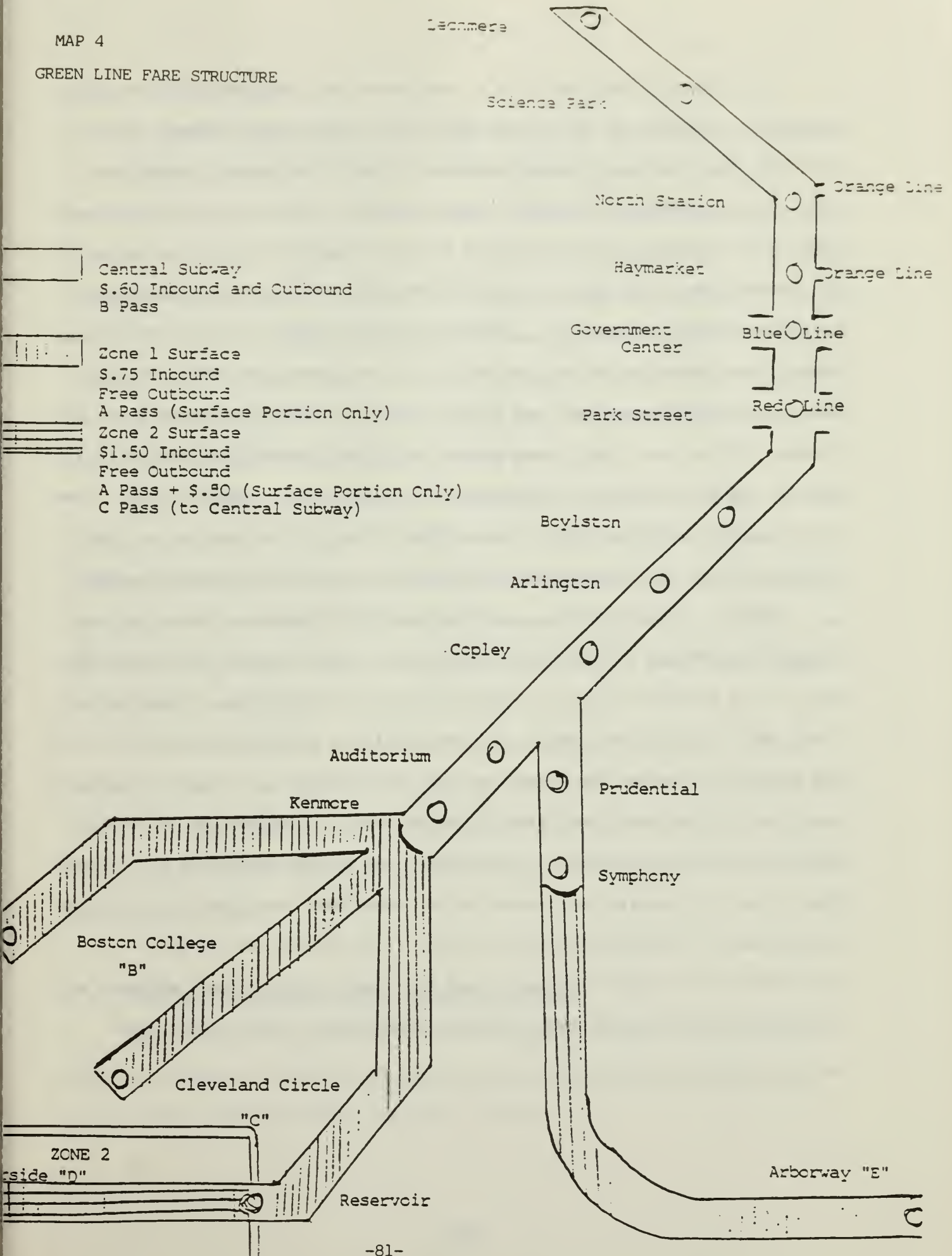
GREEN LINE FARE STRUCTURE

Boarding Location	Fare (\$)
Central Subway	\$.60
Surface inbound (excl. Riverside to Reservoir, D Line)	.75
Riverside to Reservoir (inbound)	1.50
Surface outbound	Free

MAP 4

GREEN LINE FARE STRUCTURE

	Central Subway \$.60 Inbound and Outbound B Pass
	Zone 1 Surface \$.75 Inbound Free Outbound A Pass (Surface Portion Only)
	Zone 2 Surface \$1.50 Inbound Free Outbound A Pass + \$.50 (Surface Portion Only) C Pass (to Central Subway)



In defense of the Green Line's complicated and somewhat arbitrary fare structure, officials at the T argue that Green Line surface transit operates more like bus than rapid transit service. Once in the subway, Green Line service most resembles "standard" subway service. If this is truly the case, then the surface-only round trip fare per zone should be \$1.00 (the price of two one-way bus trips) and not the \$.75 the Authority currently charges and there should be provision for a local fare within Newton. On the other hand, those riders boarding the surface portion of the Green Line and continuing into the central subway must pay \$.75 to board an inbound train and then, on return, \$.60 to board the intown subway for a total round-trip fare of \$1.35. This is 13% more than the \$1.20 charged all other Zone 1 subway riders. Some would further argue that Green Line surface travel is far inferior to rapid transit service, so charging higher fares for less service is doubly unfair.

There is a local service pass provision for Riverside riders, who are allowed to purchase a "Surface Vehicle" A pass (\$18.00/month) to access this part of the Riverside Line, to which they add \$.50 cash fare. According to the T, this inbound fare compensates for the free, outbound service offered on the surface portion of the Green Line and is equivalent to a round trip Zone 1 bus trip. Riding only from Riverside to Reservoir is equivalent to riding within one zone (a distance of 6.34 miles), but riding round-trip on a regular Zone 1 bus only requires an A pass, and no additional cash fare. In addition to the lack of consistency on fare levels, it is unclear how or why T personnel can distinguish between local and long distance riders who have an A pass plus \$.50 but cannot make the same judgements for cash only riders.

10.1.2 Red Line Model

On the South Shore branch of the Red Line (the only other zoned section of the MBTA's rail system) such cash-fare inequities do not exist. A passenger boarding at Braintree or Quincy/Adams, for example, pays \$1.20 and deposits two tokens (the Zone 3 fare) in the entrance turnstile. If he or she alights at North Quincy (or any Red Line station south of that point - see map on page 3) he or she may request a warrant from the token attendant, to be redeemed for \$.60 (the price of one of the deposited tokens) upon alighting. The T reports minimal problems with this system. No such system operates along the Riverside - Reservoir part of the "D" Line.

The T counters that it would be impossible to implement such a warrant system on the Riverside Branch because above-ground Green Line stops are unmanned; therefore, no possibility exists for patrons to get money back from the Authority. The simple solution that warrants could be used as fare (just like a ten ride ticket) or even redeemed in town only at token booths seems to have eluded T management.

It is unlikely that significant warrant abuse would occur. Even if riders give their warrants to someone else, they have deprived only themselves of the \$.75 fare rebate. The T would be providing that warrant ride in any case. Use of special tokens or paper with a numbering system should control any employee abuse.

10.2 Express Bus Service Versus Local Bus Service

According to the Authority's Service Planning Office, the following definitions from the MBTA Service Policy for Surface Public Transportation are used to differentiate express and local service:

Regular Route Service:

A bus service operated primarily on arterial streets, making a minimum of eight (8) pickup/dropoff stops per mile and having an average operating speed of generally 15 mph or less.

Express Service:

A bus service having at least two of the following characteristics:

- o average operating speed in excess of local bus service speeds and nearly equivalent to average automobile speeds for the same trip (generally between 15 mph and 35 mph);
- o the existence of a distinct line-haul or limited-stop segment to the route which is greater than 50% of the one-way mileage of the route;
- o the use of vehicles equipped with padded or upholstered seats as the primary type of revenue vehicle assigned to the service.

The MBTA operates limited-stop express bus service along 23 routes radiating primarily north and west of Boston. Service frequency ranges from every five minutes on several of the T's Turnpike routes west of the city to one trip each way on the Happy Valley (Lynn) route. Not all of the routes enter the city over limited-access highways. MBTA figures indicate that the average speed of an express bus is 25.8 mph, ranging from 16.3 mph (No. 315 bus) to 32 mph (No. 352 bus).

The MBTA fare structure treats express bus service as a premium service with fares from a \$1.00 base rather than the \$.50 local bus route base. The rationale used by transit providers to justify higher fares is that express bus service is inherently a costly, one-way operation with buses running empty in the direction opposite from the peak passenger flow. In addition, express bus routes are usually operated in limited-stop fashion or along divided limited-access highways, thus offering a faster service. Although the MBTA assigns buses outfitted with a gear ratio appropriate for highway operation

to express bus routes, the T, unlike most transit agencies, does not use buses that are more comfortably appointed than its regular buses (i.e. reclining seats, reading lamps).

While it is the T's intention to charge express bus passengers a premium fare for a faster, limited-stop trip, one can argue that the opposite is sometimes true. In fact, it has been argued that most express bus passengers pay lower fares than other passengers on slower, parallel local routes. See Appendix G for a map of express bus routes.

For example, "Passenger C" pays \$1.00 to ride the route 304 Turnpike express for the nine mile, 20 minute trip from Watertown Square to Boston's Financial District. "Passenger D" pays \$1.00 to board local Route 76 in the Five Forks section of Lexington and rides nine traffic-snarled miles to Alewife station - arriving 30 minutes later. Passenger "C" also has the option of taking the local route - Route 57 Watertown Square to Kenmore for \$.50 plus the Green Line from Kenmore to Government Center for an additional \$.60. Time approximately 45 minutes, cost \$1.10.

The MBTA's Service Planning Office reports minimal complaints from patrons regarding such inequity. Although during discussions T officials pointed out the capacity problems on current express bus routes, they were mildly responsive to considering raising bus fares. This is an area which needs further study.

10.3 Parking Fees and Fares

10.3.1 Overview

Parking fees at MBTA commuter lots are an integral part of passenger cost for a multimodal transit trip. As a consequence, the cost of fares plus parking should be evaluated.

TABLE 20

SUPPLY AND OCCUPANCY OF MBTA PARK-RIDE FACILITIES

FACILITY	CAPACITY*	MID-DAY OCCUPANCY**	PERCENT OCCUPANCY
RAPID TRANSIT			
NORTH SHORE:			
Wonderland (Ocean Avenue)	220	220	100%
Wonderland	658	658	100%
Beachmont	394	394	100%
Suffolk Downs	84	84	100%
Orient Heights (Open Portion)	324	324	100%
NORTH:			
Oak Grove	768	768	100%
Malden Center	165	175	106%
Wellington	1253	1266	101%
Sullivan Square	217	217	100%
NORTHWEST:			
Lechmere	257	257	100%
Alewife	2209	1767	80%
WEST:			
Brookline Village	15	15	100%
Brookline Hills	15	15	100%
Beaconsfield	15	15	100%
Chestnut Hill	70	70	100%
Eliot	55	55	100%
Waban	54	54	100%
Woodland	448	448	100%
Riverside	1128	1128	100%
SOUTH SHORE:			
North Quincy	818	818	100%
North Quincy (Newport)	371	371	100%
Wollaston	522	548	105%
Quincy Center (Commuter Portion)	872	872	100%
Quincy Adams	2077	2077	100%
Braintree	1137	1217	107%
Milton Village	48	35	73%

*Source: MBTA Inventory of Commuter Rail and Rapid Transit Park-Ride Facilities, May 1988.

**Source: Preliminary Draft prepared by TAMS, Inc. with Cambridge Systematics for the City of Boston.

TABLE 20 (CONTINUED)

SUPPLY AND OCCUPANCY OF MBTA PARK-RIDE FACILITIES

FACILITY	CAPACITY*	MID-DAY OCCUPANCY**	PERCENT OCCUPANCY
COMMUTER RAIL			
NORTH SHORE:			
Beverly Depot	200	200	100%
Montserrat	107	100	93%
North Beverly	90	70	78%
Hamilton-Wenham	85	43	50%
Ipswich	170	100	59%
NORTH:			
Reading Depot	380	190	50%
NORTHWEST:			
West Concord	97	68	70%
WEST:			
Wellesley Farms	135	135	100%
West Natick	163	163	100%
SOUTHWEST:			
Endicott	45	45	100%
Islington	55	55	100%
Norwood Depot	140	140	100%
Walpole	90	90	100%
Norfolk	230	230	100%
Franklin Depot	165	172	104%
Fairmount	36	36	100%
Route 128	820	820	100%
Attleboro	860	860	100%
Canton Junction	597	597	100%
Canton Center	209	209	100%
Stoughton	441	441	100%

*Source: MBTA Inventory of Commuter Rail and Rapid Transit Park-Ride Facilities, May 1988.

**Source: Preliminary Draft Prepared by TAMS, Inc. with Cambridge Systematics for the City of Boston.

TABLE 21

MBTA RAPID TRANSIT ROUND TRIP COSTS - CASH FARES PLUS PARKING FEES

Station	Miles* Rd. Trip	Rd. Trip Fare (\$)	All Day Parking (\$)	Total Cost	Total Cost/Mile	Parking Lot Lessee***
=====						
RED LINE						
(to Downtown Xing)						
Braintree	23.05	2.40	1.50	3.90	0.17	K
Quincy Adams	19.33	2.40	1.50	3.90	0.20	K
Quincy Center	16.68	1.80	1.50	3.30	0.20	K
Wollaston	14.11	1.20	1.00	2.20	0.16	K
North Quincy (two lots)	12.52	1.20	1.00	2.20	0.18	K
Milton	13.62	1.20	1.00	2.20	0.16	K
Mattapan	16.65	1.20	1.00	2.20	0.13	K
(to Park Street)						
Alewife	11.71	1.20	3.00	4.20	0.36	A
Harvard**	6.61	2.20	1.00	3.20	0.48	A

BLUE LINE						
(to State Street)						
Wonderland	11.17	1.20	1.00	2.20	0.20	K
Beachmont	8.91	1.20	1.00	2.20	0.25	K
Suffolk Downs	7.84	1.20	1.00	2.20	0.28	K
Orient Heights	6.89	1.20	1.00	2.20	0.32	K

ORANGE LINE						
(to State Street)						
Oak Grove	12.06	1.20	1.50	2.70	0.22	A
Malden Center	10.41	1.20	1.50	2.70	0.26	A
Wellington	6.90	1.20	1.50	2.70	0.39	A
Sullivan Square	4.52	1.20	1.50	2.70	0.60	A

GREEN LINE						
(to Park Street)						
Lechmere	3.78	1.20	1.50	2.70	0.71	A
Chestnut Hill	12.67	2.10	1.00	3.10	0.24	A
Eliot	18.71	2.10	1.00	3.10	0.17	A
Waban	20.44	2.10	1.00	3.10	0.15	A
Woodland	22.09	2.10	1.00	3.10	0.14	A
RIVERSIDE 'D'	23.95	2.10	1.25	3.35	0.14	A

* Assumes round trip to destination listed under Line

** Assumes parking at Arlington Heights satellite lot and use of #77 bus.

*** 'A' = Allright Boston Parking, Inc.

'K' = Kinney System of Boston, Inc.

TABLE 22

MBTA COMMUTER RAIL ROUND TRIP COSTS (BY ZONE)
CASH FARES PLUS PARKING FEES

Zone	Miles (RT)	Fare (\$)	All-Day	Total	Total Cost	Owner: T/
		Round Trip	Parking (\$)	Cost (\$)	Per Mile (\$)	Muni/ Other
ZONE 1AA						
B PASS \$22/MO.						

Back Bay	2.40	1.20	N/A	1.20	0.50	
Morton Street	10.54	1.20	N/A	1.20	0.11	
Uphams Corner	4.72	1.20	N/A	1.20	0.25	
ZONE 1A						
B PASS \$22/MO.						

Chelsea	16.00	1.50	N/A	1.50	0.09	
Forest Hills	10.30	1.50	N/A	1.50	0.15	T
Malden Center	9.00	1.50	N/A	1.50	0.17	
Porter Square	7.00	1.50	N/A	1.50	0.21	T
W. Roxbury	16.10	1.50	0.00	1.50	0.09	T
W. Medford	13.00	1.50	0.00	1.50	0.12	O
ZONE 1						
D PASS \$40/MO.						

Bellevue	14.38	2.50	0.00	2.50	0.17	T
Belmont Center	13.00	2.50	N/A	2.50	0.19	O
Fairmount	14.00	2.50	0.00	2.50	0.18	T
Highland	15.30	2.50	0.00	2.50	0.16	T
Melrose Highlands	14.50	2.50	0.00	2.50	0.17	M
Melrose/Cedar Pk	13.00	2.50	0.00	2.50	0.19	M
Newtonville	16.00	2.50	N/A	2.50	0.16	M
Roslindale	12.86	2.50	0.00	2.50	0.19	T
Waverley	15.00	2.50	N/A	2.50	0.17	
Wedgemere	16.00	2.50	0.00	2.50	0.16	M
Winchester Center	17.00	2.50	0.00	2.50	0.15	M
Wyoming Hill	12.00	2.50	0.00	2.50	0.21	

Note: Destination either North or South Station
Midlands Branch destination Back Bay

N/A means parking not available

TABLE 22 (CONTINUED)

MBTA COMMUTER RAIL ROUND TRIP COSTS (BY ZONE)
CASH FARES PLUS PARKING FEES

Zone	Miles (RT)	Fare (\$)	All-Day Round Trip Parking (\$)	Total Cost (\$)	Total Cost Per Mile (\$)	Owner: T/ Muni/ Other
ZONE 2						
E PASS \$48/MO.						

Auburndale	21.00	3.00	0.00	3.00	0.14	M
Brandeis/Roberts	23.00	3.00	0.00	3.00	0.13	T
Central Sq./Lynn	19.00	3.00	N/A	3.00	0.16	
Endicott	20.00	3.00	0.00	3.00	0.15	M
Greenwood	16.50	3.00	0.00	3.00	0.18	O
Hersey	22.08	3.00	0.00	3.00	0.14	M
Mishawum Pk	25.50	3.00	0.00	3.00	0.12	T
Needham Jct	24.08	3.00	0.00	3.00	0.12	T/O
Needham Ctr	25.44	3.00	N/A	3.00	0.12	M
Needham Hghts	27.24	3.00	0.00	3.00	0.11	M
Reading	23.00	3.00	0.00	3.00	0.13	M
Readville	18.00	3.00	0.00	3.00	0.17	T
Route 128	23.50	3.00	0.00	3.00	0.13	T
Waltham	20.00	3.00	0.50	3.50	0.18	
Wakefield	19.00	3.00	0.00	3.00	0.16	T
West Newton	18.00	3.00	0.00	3.00	0.17	
ZONE 3						
F PASS \$56/MO						

Canton Ctr	32.00	3.50	0.00	3.50	0.11	T
Canton Jct	30.00	3.50	0.00	3.50	0.12	T
Hastings	26.50	3.50	0.00	3.50	0.13	T
Islington	26.00	3.50	0.00	3.50	0.13	T
Kendall Green	25.00	3.50	0.00	3.50	0.14	M
N Wilmington	27.00	3.50	0.00	3.50	0.13	T/M
Norwood Ctrl	30.00	3.50	0.00	3.50	0.12	T
Norwood Depot	29.00	3.50	0.00	3.50	0.12	M
Salem	32.50	3.50	0.00	3.50	0.11	T
Silver Hill	29.40	3.50	N/A	3.50	0.12	
Swampscott	25.60	3.50	0.00	3.50	0.14	T
Wellesley Farms	25.00	3.50	0.00	3.50	0.14	M
Wellesley Hills	27.00	3.50	0.50	4.00	0.15	M
Wellesley Square	29.00	3.50	0.50	4.00	0.14	M
Wilmington	30.00	3.50	0.00	3.50	0.12	O

Note: Destination either North or South Station
Midlands Branch destination Back Bay

N/A means parking not available

TABLE 22 (CONTINUED)

MBTA COMMUTER RAIL ROUND TRIP COSTS (BY ZONE)
CASH FARES PLUS PARKING FEES

Zone	Miles (RT)	Fare (\$)	All-Day	Total	Total Cost	Owner: T/
		Round Trip	Parking (\$)	Cost (\$)	Per Mile (\$)	Muni/ Other
ZONE 4						
G PASS \$65/MO.						

Ballardvale	40.50	4.00	0.00	4.00	0.10	T
Beverly Depot	36.50	4.00	*	4.00	0.11	O
Lincoln	33.50	4.00	0.00	4.00	0.12	M
Montserrat	32.50	4.00	0.00	4.00	0.12	T
Natick	35.00	4.00	0.00	4.00	0.11	
Plimptonville	35.40	4.00	N/A	4.00	0.11	
Sharon	37.00	4.00	0.00	4.00	0.11	M/T
Walpole	39.00	4.00	0.00	4.00	0.10	T
West Natick	38.00	4.00	0.00	4.00	0.11	T
Windsor Gardens	35.00	4.00	0.00	4.00	0.11	
ZONE 5						
H PASS \$74/MO.						

Andover	46.00	4.50	0.00	4.50	0.10	T
Beverly Farms	44.00	4.50	0.00	4.50	0.10	O
Concord	40.00	4.50	0.00	4.50	0.11	O
Framingham	43.00	4.50	0.00	4.50	0.10	T
Hamilton-Wenham	38.00	4.50	0.00	4.50	0.12	
Norfolk	46.00	4.50	0.00	4.50	0.10	T
N Beverly	41.00	4.50	0.00	4.50	0.11	T
N Billerica	47.00	4.50	0.00	4.50	0.10	T
Prides Crossing	44.40	4.50	0.00	4.50	0.10	O
W Concord	42.50	4.50	0.00	4.50	0.11	M
ZONE 6						
J PASS \$79/MO.						

Franklin	55.50	5.00	0.00	5.00	0.09	T
Ipswich	46.50	5.00	0.00	5.00	0.11	M
Lawrence	53.00	5.00	0.00	5.00	0.09	O
Lowell	54.00	5.00	0.00	5.00	0.09	
Manchester	48.00	5.00	0.00	5.00	0.10	O
Mansfield	50.00	5.00	0.00	5.00	0.10	
South Acton	50.00	5.00	0.00	5.00	0.10	

Note: Destination either North or South Station
Midlands Branch destination Back Bay

N/A means parking not available

TABLE 22 (CONTINUED)

MBTA COMMUTER RAIL ROUND TRIP COSTS (BY ZONE)
CASH FARES PLUS PARKING FEES

Zone	Miles (RT)	Fare (\$)	All-Day Round Trip Parking (\$)	Total Cost (\$)	Total Cost Per Mile (\$)	Owner: T/
						Muni/ Other
ZONE 7						
K PASS \$84/MO.						

Attleboro	64.00	5.50	0.00	5.50	0.09	T
Bradford	66.00	5.50	0.00	5.50	0.08	T/O
Gloucester	63.00	5.50	0.00	5.50	0.09	O
Haverhill	66.50	5.50	N/A	5.50	0.08	
Littleton	60.00	5.50	0.00	5.50	0.09	T
W Gloucester	59.20	5.50	0.00	5.50	0.09	T

ZONE 8
L PASS \$89/MO.

Ayer	73.00	6.00	0.00	6.00	0.08	O
Shirley	77.00	6.00	0.00	6.00	0.08	T
Rockport	70.00	6.00	0.00	6.00	0.09	M

ZONE 9
M PASS \$94/MO.

Fitchburg	99.00	7.00	0.00	7.00	0.07	T
N Leominster	87.00	7.00	0.00	7.00	0.08	T/O

Note: Destination either North or South Station
Midlands Branch destination Back Bay

N/A means parking not available

Source: Telephone surveys with communities, Winter 1987;
Conversation with Richard Leonard, October 1987 (MBTA Commuter Rail Dept.)
Conversation with Charles Steward, September 1987 (MBTA Construction Dept.)
MBTA Inventory of Commuter Rail and Rapid Transit Park-Ride Facilities, May 19

According to an MBTA Inventory of Commuter Rail and Rapid Transit Park-Ride Facilities, from May 1988, it is estimated that the MBTA operates over 26,800 park-and-ride spaces. Within this total 15,060 spaces are located at light and heavy rail stations and 11,750 at commuter rail stations. T officials have stated that occupancy rates at the great majority of these lots are at or over capacity (see Table 20). The MBTA reports that it is aggressively exploring the development of more spaces throughout the system, a goal which has generated a good deal of interest within communities.

Two schools of thought regarding transit parking fees are evident among parties interested in the MBTA district:

1. Equity viewpoint; and
2. Supply and demand/revenue maximization viewpoint.

10.3.2 Equity Issues

As discussed in Section Two, the consistency principle frequently used to define equity requires that public transit passengers be treated similarly in similar circumstances. Applied to parking, it suggests that parking at major terminals should be consistently priced unless benefits and/or costs differ substantially. It further suggests that fare plus parking be comparable for comparable service.

In order to collect information on current practice, staff surveyed the fees at all commuter lots. Findings are included in Tables 21 and 22 for rapid transit and commuter rail lots, respectively. The tables, which add fares plus parking fees for a total round-trip cost, indicate inconsistency in T policy.

A comparison of North Quincy, Alewife and Wonderland - all rapid transit stations approximately the same distance from downtown Boston - illustrates

the inconsistencies. A comparison of outlying Red Line and Green Line Stations further verifies the inconsistencies.

The MBTA has had a longstanding informal policy to charge no fees at T-owned commuter rail lots, while other service modes have parking fees ranging from \$1.00 to \$3.00. Presumably, this policy was intended to encourage ridership on commuter rail lines. According to the Advisory Board's FY86 Annual Report, rush hour commuter rail ridership ran up to 170% of seating capacity in FY 86 and all indications are that it has continued to grow. This brings into question the need to promote ridership by providing free parking.

Further, commuter rail riders already receive a disproportionately high subsidy relative to riders of other modes. Consequently, the free parking policy exacerbates an already existing inequity.

10.3.3 Supply and Demand/Revenue Maximization

The supply and demand advocates argue that fees should be set as high as possible and the lots kept full, assuming existing parking facilities are equipped to handle their capacity without negative community impacts. This will maximize Authority revenues as well as use of the transit system. Major commuter rail lots and large terminal lots on other modes (Braintree, Riverside, etc.) currently fill early in the a.m. rush and cars are turned away daily. Higher fees, if set appropriately, would not decrease ridership but would increase total revenue.

Those interested in minimizing traffic argue that parking fees should be higher the closer to the CBD one travels, thus encouraging park and ride patrons to enter the system at the most appropriate outlying point. In addition, higher parking fees may encourage some patrons to use feeder service (usually bus service) to a major line - a factor which may minimize traffic congestion and enhance fare revenues on underutilized routes.

Summary Recommendations

1. Charge fees for parking at all T-owned lots;
2. Ensure that, wherever practicable, T parking fees are compatible with local transit/parking requirements, and result in minimal negative impact on the local area; and
3. Consider charging higher fees closer to the CBD.

SECTION 11 - REVENUE PROJECTIONS

11.1 Revenue Enhancement and Appropriate Fare Pricing Alternative

In keeping with the Advisory Board's ongoing recommendation to develop a mechanism to trigger small frequent fare increases, there are two primary ways to approach such an increase: by tying increases to some sort of inflationary index, such as the Boston CPI; or by establishing a fare revenue goal as a percentage of the annual expense of operating MBTA services.

As indicated in Section Five, which reviews the fare recovery ratio policies of comparable transit agencies across the country, the majority of agencies ascribe to a fare recovery ratio approach. This is not surprising considering the arbitrariness of pre-established, periodic fare increases tied to an "external" economic indicator which may have little or no relevance to the "internal" financial condition of a transit agency.

Although the 1983 EIR Report suggested reviewing fare revenue goals annually, as discussed in Section Two, this approach has not been embraced by the MBTA or the Secretary of Transportation. A mechanism should be instituted which would base fares on fiscal needs and cost recovery goals. The establishment of these goals could be handled in a variety of ways. They could be developed and instituted by policymakers at the Advisory Board or they could be legislated at the state level. With either option, an appropriate fare recovery ratio range could be adopted, with the determination of the appropriate ratio reviewed by the Advisory Board as part of the budget process.

Limitations in the MBTA's revenue/ridership data base preclude detailed analysis of ridership/revenue impacts resulting from fare changes.

Nevertheless, broad scale systemwide revenue projections will be made based on the level of data which exists.

11.2 Elasticity Measures

It is commonly accepted in the transit industry that any fare increase will reduce transit ridership. It is important to project ridership loss for any fare increase alternative to obtain a reasonably accurate measure of revenue gain. Responses to a fare increase or "fare elasticity" can be explained as the percentage change in ridership resulting from a 1% change in fare. For example, a fare elasticity of (-.3) indicates that for each percentage increase in fares, ridership will be reduced by 0.3%. Ridership change following a fare increase is estimated by multiplying the appropriate fare elasticity by the percentage fare increase, times existing ridership.

The following formula is commonly used:

$$\text{Ridership Generated or Lost} = \frac{\text{Change in Fare}}{\text{Existing Fare}} \times (\text{Elasticity}) \times (\text{Ridership})$$

Table 23 on the next page provides a survey of transit elasticities used at various transit agencies comparable to the MBTA. There has been a good deal of research on elasticities in recent years and analysts generally agree that ideally they should be broken down into categories by peak or off-peak, service mode, distance traveled and passenger demographics.

A comprehensive review of public transit fare elasticities was prepared by Ecosometrics in 1980 and published in Patronage Impacts of Changes in Transit Fares and Services. The following is a summary of their principal findings concerning fare elasticities:

- * Elasticities for fare increases do not differ from those for fare decreases.
- * Small cities have larger fare elasticities than large cities.

TABLE 23
SURVEY OF TRANSIT ELASTICITIES

System	Author	Source*	Rail			Mean	Bus			Mean
			Peak	Off	Pk		Peak	Off	Pk	
Nationwide	Curtin	H+E					-0.36		-0.36	
Chicago	Talvitie	H	-0.38				-0.38			
	Lisco	H	-0.40				-0.40			
Louisville	Fulkerson	H					-0.40			
So. California	So. Cal. RTD	H					-0.09		-0.15	
Toronto**		H	-0.09				-0.21			
London	Rendle, Mack	E				-0.16				-0.33
Paris	Bly	E				-0.15				-0.30
New York	Hartgen, Howe	E								-0.25
New York	Ecosometrics	E	-0.4	-0.11						
San Francisco	McFadden	E								-0.58
St. Louis	Ecosometrics	E					-0.15	-0.39		-0.24
Madison, WI	Ecosometrics	E						-0.32		
Denver	Ecosometrics	E						-0.29		
Average			-0.32	-0.11		-0.16	-0.31	-0.26		-0.29

* Cited in: H = Department of City and Regional Planning, Harvard University, "Evaluation of Alternative Fare Structures for the MBTA" (1980)

E = Ecosometrics, Inc., "Patronage Impacts of Changes in Transit Fares and Elasticities" (1980)

** Cited in Harvard Study, no author given

- * Bus travel is more elastic than commuter and rapid-rail travel.
- * Off-peak fare elasticities are double the size of peak-fare elasticities.
- * Short-distance trips are more elastic than long-distance trips.
- * Fare elasticities rise with income and fall with age.
- * Of all trip purposes, the work trip is the most inelastic.

A major problem in deriving fare elasticities from transit ridership statistics is distinguishing the effects of change in fare from seasonal variations, weather effects, variations in supply and particularly from service adjustments which often accompany fare increases.

The importance of developing fare elasticities and adjusting for service reductions was discussed in the 1983 EIR. The authors of this report developed a method to estimate the number of trips lost due to service cuts and isolated the effects of these changes from the fare increase. Elasticity measures of $(-.19)$ for unlinked bus trips and $(-.22)$ for unlinked rapid transit trips were developed for the EIR. The figures represent each mode's elasticity of demand with respect to its fare. Since commuter rail was not included in the EIR, an elasticity of $(-.17)$ was obtained from the 1976 Boston Commuter Rail Survey. The well known "Curtin Rule" ascribes to an elasticity of $(-.3)$ for systemwide fare increases.

11.3 Ridership Measures

As discussed in Section Six, the MBTA does not count total riders on a daily, monthly - or any regular - basis. Therefore, when making revenue projections, ridership levels must be estimated using revenue and an estimate of the average fare paid by passengers for each service mode. See Table 24 for a breakdown of fare revenue for Fiscal Years 86 and 87.

TABLE 24

MBTA FARE REVENUE, FY86 - FY87

CASH FARES	FY 1986	FY 1987	% TOTAL FY87	%CHANGE FY 86/87
RED LINE	\$13,332,951	\$14,256,938	13.13%	6.93%
ORANGE LINE	\$9,863,972	\$10,387,144	9.56%	5.30%
BLUE LINE	\$2,958,347	\$3,268,218	3.01%	10.47%
GREEN LINE	\$5,182,739	\$6,349,988	5.85%	22.52%
CENTRAL SBWY.	\$12,734,696	\$11,849,880	10.91%	-6.95%
BUS	\$25,409,864	\$24,573,609	22.63%	-3.29%
TRACKLESS TR	\$697,686	\$845,958	0.78%	21.25%
	-----	-----	-----	-----
SUBTOTAL	\$70,180,255	\$71,531,735	65.87%	1.93%
PASS PROGRAM				
EXPRESS	\$19,096,008	\$20,555,374	18.93%	7.64%
LOCAL	\$14,385,674	\$15,260,539	14.05%	6.08%
	-----	-----	-----	-----
SUBTOTAL	\$33,481,682	\$35,815,913	32.98%	6.97%
STUDENT				
CHARTER	\$1,146,073	\$1,252,650	1.15%	9.30%
	\$6,359	\$9,205	0.01%	44.76%
	-----	-----	-----	-----
SUBTOTAL	\$1,152,432	\$1,261,855	1.16%	9.49%
	=====	=====	=====	=====
GRAND TOTAL	\$104,814,369	\$108,609,503	100%	3.62%

The 1985 MBTA-Mix Sampling Program estimates the following average fares:

TABLE 25

AVERAGE FARE ESTIMATES

BUS AND TRACKLESS TROLLEY	- \$.383
GREEN LINE	- \$.403
TOTAL SURFACE TRIPS	- \$.379
RAPID TRANSIT TRIPS	- \$.519
LINKED TRIPS	- \$.649

NOTE: These average fares take pass program usage into account.

11.4 Revenue Projections

The following broad revenue projections provide a summary of how much additional revenue would be required for a 33%, 35%, 40% and 50% fare recovery ratio - and what level of systemwide fare increase would be needed to generate these revenues.

TABLE 26

MBTA PROVIDED SERVICE FARE RECOVERY RATIOS - REVENUE PROJECTIONS

F.R.R.*	Fare Revenue	Increase Over FY 88 Authorized Revenue	Increase in Average Fare (\$.65)
-----	-----	-----	-----
30.6% (current)	\$112,214,359	\$0	\$0.00
33.0	119,619,524	9,119,524	.05 - .06
35.0	126,869,193	16,369,193	.10 - .11
40.0	144,993,363	34,493,363	.21 - .24
50.0	181,241,704	70,741,704	.50 - .53

* Fare Recovery Ratio for a Net Cost of Service of \$362,483,409 (FY88 Authorized Net Cost of Service.)

- Assumptions:
1. FY88 expenses are held constant.
 2. Average fare of \$.65 for linked trips (based on 1985 Fare Mix Sampling Program).
 3. Elasticities used ranged from (-.22) to (-.30).

TABLE 27

COMMUTER RAIL FARE RECOVERY RATIOS - REVENUE PROJECTIONS

FRR	Fare Revenue Required	Increase Over FY88 Authorized Revenue	Increase in Average Fare (\$1.52)/%age
-----	-----	-----	-----
26.43% (current)	\$21,312,432	\$0	\$0.00
30.0	24,188,229	2,875,797	.22/(14.5%)
35.0	28,219,601	6,907,169	.54/(35.5%)
40.0	32,250,972	10,938,540	.90/(59.2%)
45.0	36,282,344	14,969,912	1.30/(85.5%)

Assumptions:

1. FRR for a Net Cost of \$59,315,000 (FY88 Authorized)
2. FY88 expenses are held constant
3. Average fare based on FY87 total ridership figure (13,562,861), divided by FY87 fare revenue
4. Elasticity used (-.17)

SECTION 12 - SUMMARY RECOMMENDATIONS

Given that the fare recovery ratio for T delivered services has steadily declined from 35.56% in FY84 to 30.48% in FY88, there should be no delay in recommending a strategy which will end this downward trend. At the same time that current fares are being examined with regard to the fare recovery ratio, they should also be reviewed for the purpose of correcting the inequities and anomalies which have been brought to light in the course of this study.

Specific recommendations are:

1. Base Fares on Fiscal Needs and Cost Recovery Goals - Appropriate and realistic fare income goals should be developed by the Advisory Board and the MBTA Board of Directors. A fare recovery ratio range should be adopted; review of T revenue performance by the Advisory Board should be part of the annual budget process. A drop in T revenue causing the fare recovery ratio to fall below the established range should trigger a review of fare levels and other sources of T revenue.
2. Revise Existing Transfer Policies - A fair and rational transfer policy should be established which encourages use of public transit. Any such system should not penalize transit dependent people who are unable financially to take advantage of the pass program. In addition, an analysis should be conducted of the effects of free intra- and inter-modal transfers on revenue and on the various ridership populations. A time-limited free intra- and inter-modal transfer system is recommended.

3. Establish a System for Special Fares Whereby the Appropriate Agency or Department Subsidizes the Reduced Fares - Special fares should be subsidized and administered by appropriate State agencies, not the transit system. In certain cases (i.e., fares for senior citizens) this may necessitate a change in the State law.

4. Review and Revise Pass Program, Ideally After Overhaul of MBTA Fare Structure - The inconsistencies in the "break-even" points between passes (i.e., the A pass breaks even at 18 round trips, whereas the Zone 9 (M) pass breaks even at 13.4 round trips) should be eliminated. By adjusting the "break even" point of all commuter rail passes to 18 round trips, it is estimated that revenue would increase by \$498,648 per year before an increase in fares is even instituted. In addition, the total systemwide access allowed by commuter rail passes should be factored into the pass price (or be offered to commuter rail riders as an option on a higher priced pass). Further, the complex uses allowed for the A through E passes should be modified or eliminated, and discrepancies between published uses of passes A through C and actual practice should be addressed. Finally, the possibility of providing a variety of short-term passes geared to attracting to public transit different segments of the population should be investigated.

5. Parking Fees - A parking fee structure for all T lots should be established consistent with the following criteria:

- encourage transit ridership from furthest point outside city;
- maximize/balance ridership and net revenue;
- minimize impact on local traffic; and,
- be consistent with local parking fees.

APPENDICES

APPENDIX A

MBTA BUS SYSTEM FARES

<u>Zone</u>	<u>Route Miles</u>	<u>Adult Fare**</u>	<u>Student & Child Fare</u>	<u>Elderly Fare</u>
1	0-6	\$0.50	\$.25	\$.10
2	6-9	0.75	.35	.35
3	9-12	1.00	.50	.50
4	12-15	1.25	.60	.60
5	15+	1.50	.75	.75

*Zone fares may be adjusted based on geographic, topographic, or other distinctive circumstances in order to establish logical boundaries.

**NOTES ON ADULT FARE:

- o Base Fare - \$0.50, good for all routes that are less than six miles and for the first six-mile zone on routes longer than six miles.
- o Zone Fares - Additional \$0.25 for each three-mile increment.
- o Express Premium - Additional \$0.25 for express-bus services.
- o Maximum Fare - \$1.50, including express premium.

MBTA COMMUTER RAIL ZONAL AND INTERZONAL FARE STRUCTURE

Zone Fares

Zone	One Way	Children (5-11)	Students with Pass	12 Ride	Monthly	Family
		Senior Citizens	Special Needs		Pass	Fare*
1A	\$.75	\$.60		\$13.75	\$ 22.00	\$ 5.00
1	1.25	.60		13.75	40.00	5.00
2	1.50	.75		16.50	48.00	6.00
3	1.75	.85		19.25	56.00	7.00
4	2.00	1.00		22.00	65.00	8.00
5	2.25	1.10		24.75	74.00	9.00
6	2.50	1.25		27.50	79.00	10.00
7	2.75	1.35		30.25	84.00	11.00
8	3.00	1.50		33.00	89.00	12.00
9	3.50	1.75		35.75	94.00	13.00
10	4.00	2.00		38.50	99.00	14.00
11	4.50	2.25		41.25	104.00	15.00

*Not valid during peak hours

Interzone Fares

Travel between any two stations (except to or via Boston, Back Bay/South End, Porter Square or Malden Center).

Number of Zones Travelled	One-Way (Available on train)	Children (5-11)	Students with Pass	Monthly Interzone Pass	Family Fare*
		Senior Citizen	Special Needs		
1	\$.75	\$.35		\$24.00	\$ 3.00
2	1.00	.50		30.00	4.00
3	1.25	.60		36.00	5.00
4	1.50	.75		42.00	6.00
5	1.75	.85		48.00	7.00
6	2.00	1.00		54.00	8.00
7	2.25	1.10		60.00	9.00
8	2.50	1.25		66.00	10.00
9	2.75	1.35		72.00	11.00
10	3.00	1.50		78.00	12.00
11	3.25	1.60		84.00	13.00

*Not valid during peak hours

SURVEY ON FARE RECOVERY RATIO

TELEPHONE NO:

In the first column below, FY 1985 MBTA operating costs have been used as an example. Please complete the other columns with information on your agency's costs beginning with the most recent fiscal year for which you have figures.

OPERATING BUDGET

Fare Revenue	<u>103,189,675</u>
Total Income	117,424,895

Labor Costs	<u>225,160,141</u>
Materials & Services	<u>40,127,518</u>
Fuel	<u>21,976,489</u>
Other	<u>6,007,422</u>

Subtotal	293,271,570
----------	-------------

Contracted	
Services	<u>54,860,903</u>
Debt Services	84,796,891

Total Expenses	432,929,364
----------------	-------------

Fare Recovery Ratio*	35.2%
----------------------	-------

1. Does your agency have any requirements (i.e., legislative, policy, etc.) that your farebox recovery ratio must be tied to a percentage of operating costs? Yes _____ No _____ If yes, please explain _____

2. Do you anticipate any significant changes in the fare recovery ratio in the near future? Yes _____ No _____ If yes, please explain _____

3. Additional Comments

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25. Boston, Massachusetts -- Massachusetts Bay Transit Authority

25.1 System Description

The Massachusetts Bay Transit Authority (MBTA), which provides rapid rail, streetcar, and bus service throughout the Boston metropolitan area, experimented with time-of-day pricing between 1973-75. Its integrated rapid rail and streetcar network includes over 150 miles, nearly 700 vehicles, and 42 subway stations. In 1981, the rail/streetcar system served some 130 million unlinked passenger trips, making it the fourth most heavily used urban rail system in the country.

25.2 Fare Structure

MBTA is one of the largest urban transit systems in the U.S. to attempt time-of-day pricing to date. On April 2, 1973, the regular 25 cent fare was reduced to 10 cents during the weekday hours between 10 a.m. and 1 p.m. at most rail stations, and the 50 cent fare on the Quincy line was reduced to 25 cents. Beginning in May, 1974, the discount fare hours, called Dime Time, were extended until 2 p.m. on weekdays, and Sundays were included in the program. Dime Time was suspended indefinitely on April 1, 1975.

25.3 Reasons for Adopting and for Discontinuing Time of Day Pricing

The primary rationales for adopting time-of-day pricing were to increase ridership and to flatten peak period demand. The program was based on a theory of "marginal congestion pricing", under which riders are charged according to the increment of congestion which they add to the system at the time when they ride.

MBTA dropped Dime Time because it did not appear to be having the desired impacts on ridership. MBTA estimated that the discount resulted in some \$2.2 million in lost passenger revenue per year.

25.4 Impacts and Trends Associated with Time-of-Day Pricing

In assessing the impacts of Dime Time on ridership, MBTA used both passenger counts and ridership surveys. The passenger surveys were taken one week before and in each of five weeks subsequent to implementation in the Spring of 1973. The results of the counts are summarized in Table 25.1. The data suggest that Dime Time did not increase overall ridership levels, but may have caused some intertemporal shifting of demand. Another possible interpretation of the data is that the ridership levels observed in the base week are atypically high for the period prior to Dime Time, and that the higher proportion of midday riders observed after implementation actually reflects additional demand generated by the lower fares.

Table 25.1: MBTA Subway Ridership Before and After
Dime Time Implementation

Time Period	Daily Passengers	Dime Time Passengers	Dime Time as % of Total Passengers
Base	286,333	35,726	12.4
Week I	291,962	39,973	13.6
Week II	281,148	38,372	13.6
Week III	278,269	35,446	12.7
Week IV	284,190	37,153	13.0
Week V	277,108	37,819	13.6

Passenger surveys were conducted at five outlying stations during Dime Time hours in June, 1973 and June, 1974. Inbound passengers were surveyed and asked a variety of questions intended to determine how Dime Time had affected their transit riding habits. In the first survey, 11% of the respondents stated that they were using the subway more frequently as a result of Dime Time. Among this group, the reported increase in individual ridership averaged 81%, implying an overall Dime Time ridership gain of about 9%. From the second survey, 11% of respondents also reported an increase in subway usage because of Dime Time. When combined with this group's average reported ridership increase of 42%, this suggests an overall increase of about 5%. These estimates are roughly consistent with the passenger count data presented in Table 25.1. If the actual midday ridership increase associated with lowering midday fares was in the range of 5-9%, the off-peak fare elasticity would be between -0.08 and -0.15, unusually low values compared with those generally cited in the literature.

In summary, it appears that Dime Time did result in measurable, albeit small, increases in ridership during the time in which it was in effect. Its impacts on overall ridership cannot be assessed from available data, but even if none of the additional Dime Time period rides were the result of intertemporal shifts, the overall impact would still be quite marginal.

25.5 Implementation Issues

Dime Time did not elicit strong reaction from either MTA employees or from users of the system. There is some evidence that station attendants were not entirely forthcoming in advising users of the lower Dime Time fares, but there is no indication of active resistance to the program among this group. MTA patrons seemed to accept the revised fare system with little resistance.

Dime Time fares were collected at the entrance to each station and, for passengers exiting on the Quincy Line, also at the station exit. Coin operated turnstiles served as the means of collection, and were adjusted at the beginning of the Dime Time period to accept lower fares. This procedure caused some problems during the border between the morning peak and Dime Time, when patrons waited by the turnstiles for the

lower fares to go into effect.

Marketing for Dime Time included an extensive advertising campaign, including radio, television, newspapers, and billboards, as well as signs in the MBTA stations. Results of the passenger survey indicate that, at the beginning of the program, over 80% of passengers riding during Dime Time demonstrated their familiarity with the program by paying the lower fare, and that the proportion had reached 98% one year later. The decision to suspend Dime Time also necessitated a campaign to inform the public, an archive of which is shown in Exhibit 7.2, Chapter Seven.

25.6 Summary and Prospects

MBTA staff believe that Dime Time was unsuccessful because of the limited hours during which the lower fares were in effect and the lack of an accompanying staggered work hours program. There is some interest in developing a time-of-day pricing program which avoids these obstacles, perhaps involving a directional time-of-day fares (for example, higher fares for morning inbound riders). The Massachusetts Legislature, however, has mandated that simplicity be a major objective of MBTA fare policy. It thus appears that, at least for the immediate future, MBTA will not have the opportunity to put into practice the lessons learned from Dime Time.

Source: Directly obtained from Cervero et al., Evidence on Time-of-Day Pricing in the United States, Volume 2: Appendices and Case Studies, pages 129-131.

COMMUTER RAIL REVENUE
PASSES SOLD BY ZONE
FY 1987

APPENDIX E

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 11
<u>Total</u>										
July 1986 Monthly	1138	1885	2115	2702	1189	1974	1015	132	72	9
Monthly Interzone	51		5	8	4	12			2	
12313	1189	1885	2120	2710	1193	1986	1015	132	74	9
11234	967	1731	1907	2435	1102	1838	1055	126	61	12
79	49		4	10	3	8			5	
11313	1016	1731	1911	2445	1105	1846	1055	126	66	12
15339	1345	2367	2730	3183	1532	2568	1332	181	82	19
112	62		4	13	3	30				
15451	1407	2367	2734	3196	1535	2598	1332	181	82	19
14391)										
122) - Not Available										
14513)										
11549)										
91) - Not Available										
11640)										
12116)										
83) - Not Available										
12192										
14453	1199	2069	2528	3114	1432	2397	1432	185	88	9
71	39		8		2	20		2		
14524	1238	2069	2536	3114	1434	2417	1432	187	88	9
13389	1077	1930	2089	3001	1338	2351	1348	168	81	6
85	2	1	15	14	17	27	1	5	3	
13474	1079	1931	2104	3015	1355	2378	1349	173	84	6
15835	1380	2443	2648	3361	1607	2636	1434	210	107	9
103	1	1	18	16	13	41	3	8	2	
15938	1381	2444	2666	3377	1620	2677	1437	218	109	9

COMMUTER RAIL REVENUE
PASSES SOLD BY ZONE
FY 1987
Page 2

	Zone										
	1	2	3	4	5	6	7	8	9	Zone	Zone
Total											
Apr. 1987 Monthly Monthly Interzone	13172	1118	2054	2497	2645	1205	2160	1247	170	66	10
	98		1	15	16	10	46	1	5	4	
	13270	1118	2055	2512	2661	1215	2206	1248	175	70	10
May 1987 Monthly Monthly Interzone	11633	1057	1960	1744	2412	1140	1938	1143	166	66	7
	93	3	1	15	19	11	38	1	2	4	
	11726	1060	1960	1759	2431	1151	1976	1144	168	70	7
June 1987 Monthly Monthly Interzone	14757	1260	2238	2456	3167	1467	2493	1403	178	88	7
	106	2	1	21	19	19	35	1	3	5	
	14863	1262	2239	2477	3186	1486	2528	1404	181	93	7
TOTAL FY87 MONTHLY (Oct.-Dec. only)** Monthly Interzone	160099	10541	18677	20714	26020	12012	20355	11409	1516	711	88
	1125	209	4	105	115	82	257	7	25	25	0
January - June 1987 Excludes Pass by Mail											
January - June 1987 Excludes ABC											

Source: MBTA Budget Office; according to Budget Office Oct-Dec 1986 figures
unavailable due to difficult relations with B&M.

***Note: should read "excluding Oct-Dec"

There are six Different (T) passes available each offering you a month's worth of unlimited transportation. Your new MBTA Pass can save you money on transportation, auto insurance, entertainment, and special offers.

**A 50¢ \$18.00/month
SURFACE VEHICLE ONLY**

Valid for: the Riverside to Chestnut Hill portion of the Green Line plus 50¢ cash fare inbound (also one-way ride into subway)

The surface portions of the Green Line from Reservoir to Fenway

Arbway to Northeastern

Boston College to Blandford Street

Cleveland Circle to St. Mary's

(also one way ride into subway)

All stations on the Mattapan high speed line

All local bus and trackless trolley routes that charge only a 50¢ fare

All 4¢ fare zones on suburban bus routes, balance in cash

Not valid for: any rapid transit or express bus service

Not valid for: any subway portion of the Green Line

**B 60¢ \$22.00/month
RAPID TRANSIT (MATTAPAN HIGH-SPEED LINE) AND STREETCAR**

Valid for: all 60¢ Rapid Transit stations on the Blue, Orange, and Red Lines (except Quincy Center, Quincy Adams and Braintree)

Valid for: all Green Line stations (except Chestnut Hill to Riverside)

All stations on the Mattapan High Speed Line.

Not valid for: any bus or trackless trolley service regardless of fare

Not valid for: any Rapid Transit station with a regular fare of more than 60¢

**C \$1.00 \$36.00/month
RAPID TRANSIT, STREETCAR, BUS AND EXPRESS BUS**

Valid for: all stations on the Blue, Orange, and Red Line (Except Quincy Adams and Braintree)

All stations on the Green Line including Riverside.

All \$1.00 Express or Premium Bus routes.

All 50¢ Local Bus and Trackless Trolley routes that connect with, or operate in the 60¢ Rapid Transit or 75¢ Surface Green Line areas.

Not valid for: any portion of a suburban bus route that enters, or operates in the Quincy Center, Quincy Adams and Braintree Red Line Area, or on a suburban bus route operating in the Chestnut Hill to Riverside Green Line area.

**D \$1.25 \$40.00/month
RAPID TRANSIT, STREETCAR, BUS, EXPRESS BUS, AND ZONE 1 COMMUTER RAIL.**

Valid for: all stations on the Blue, Orange, and Red Lines.

All stations on the Green Line including Riverside.

All 75¢ bus fare connecting with a 60¢ Rapid Transit Station or 75¢ Green Line Surface stop.

All 50¢ Local bus and trackless trolley routes that connect with or operate in the 60¢ Rapid Transit or 75¢ surface Green Line area.

All \$1.25 or less Express or Premium Bus routes.

Valid on Commuter Rail trains from North or South stations to any Zone 1 station Back Bay, Belmont, Cambridge-Porter Square, Fairmount (Hyde Park), Melrose-Cedar Park, Melrose Highlands, Newtonville, Waverly (Belmont), Wedgemere (Winchester), West Medford, Winchester Center, Wyoming Hill (Melrose).

Not valid for: any portion of a suburban route that enters, or operates in the Quincy Center, Quincy Adams and Braintree Red Line Area, or a suburban bus route operating in the

**E \$1.50 48.00/month
RAPID TRANSIT, STREETCAR, BUS, EXPRESS BUS AND ZONE 2 COMMUTER RAIL.**

Valid for: All stations on the Blue, Orange, Green and Red Lines.

All 50¢ local bus fares (except in the Quincy Adams and Braintree Station area)

All \$1.50 or less express or premium bus routes.

Valid on Commuter Rail Trains from North or South Stations to any Zone 1 or Zone 2 stations Auburndale (Newton), Endicott (Dedham), Greenwood (Wakefield), Lynn-Central Square, Reading, Readville, Riverworks, Brandeis-Roberts, Route 128-Dedham, Wakefield, Waltham, West Newton

Not valid for: a 50¢ suburban bus route that enters or operates in the Quincy Adams and Braintree Red Line Area.

**F \$1.75 \$56.00/month
ALL MBTA SERVICES AND ZONE 3 COMMUTER RAIL**

All MBTA subway, streetcar, bus and Zone 1-3 Commuter Rail.

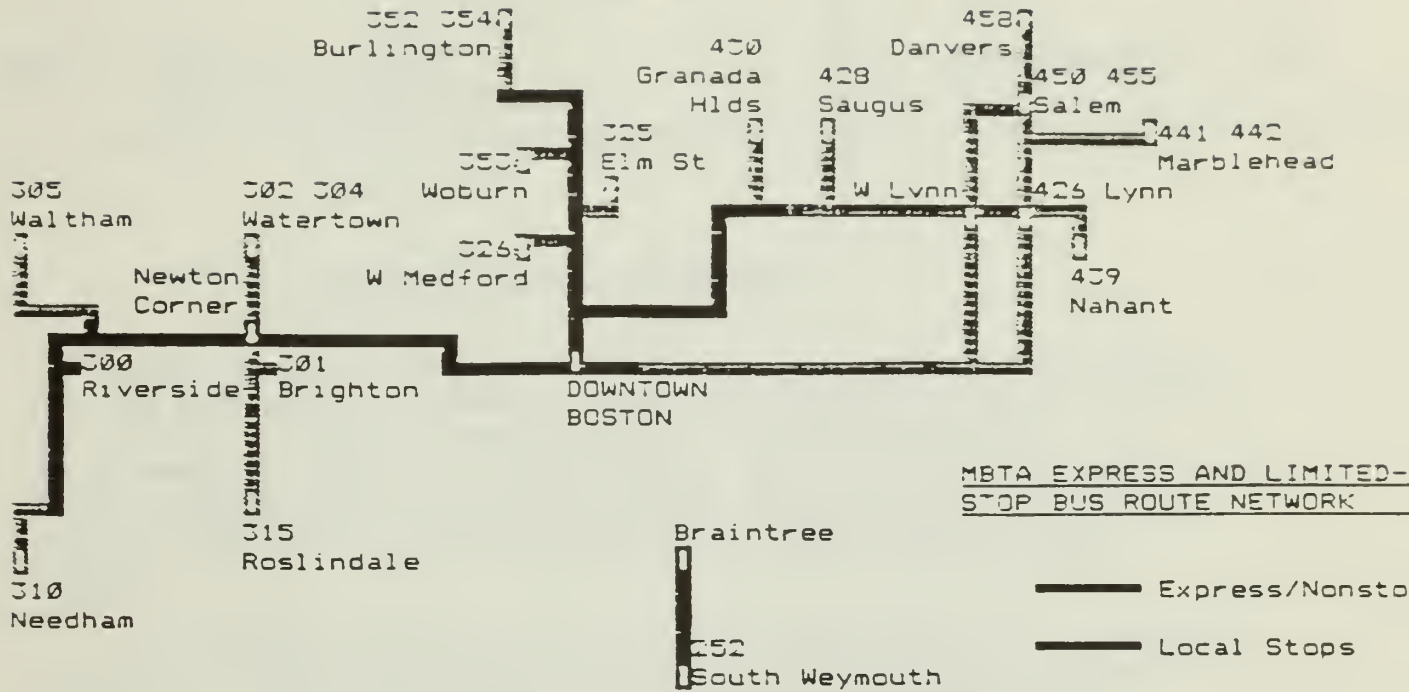
Valid on Commuter Rail Trains from North or South Stations to any Zone 1, Zone 2 or Zone 3 Stations, Canton Center, Canton Junction, Hastings (Weston), Islington (Westwood), Kendal Green (Weston), Mishawum Park-128, No. Wilmington, Norwood Depot, Norwood Central, Salem, Swampscott, Wellesley Farms, Wellesley Hills, Wellesley Sq. Wilmington.

QUESTIONS ON A (T) PASS, MONEY SAVING OFFERS, OR COMMUTER RAIL PASSES (ZONES 4-11), CALL 722-3200

Save on Federal Taxes

- Under a 1984 federal tax law (PL 38-369), any Passholder whose monthly Pass is subsidized by an employer is not required to pay federal income tax on the first \$15.00 of the monthly subsidy

APPENDIX G



MBTA EXPRESS BUS NETWORK

- 352 Braintree Station-South Weymouth via Route 3
- 300 Riverside-Downtown via Mass Pike
- 301 Broughton Center-Downtown via Mass Pike
- 302 Watertown-Back Bay via Mass Pike
- 304 Watertown-Downtown via Mass Pike
- 305 Waltham-Downtown via Mass Pike
- 310 Needham Junction-Downtown via Mass Pike
- 315 Roslindale-Back Bay via Mass Pike
- 325 Elm Street-Haymarket via I-93
- 326 West Medford-Haymarket via I-93
- 352 Burlington-Haymarket via I-93
- 353 Woburn-Haymarket via I-93
- 354 Burlington Industrial Area-Haymarket via I-93
- 426 Lynn-Haymarket via Cliftondale
- 428 Oaklandvale/Saugus Center-Haymarket
- 436 Happy Valley-Haymarket via Sumner Tunnel
- 439 Nahant-Haymarket via Sumner Tunnel
- 441 Marblehead-Haymarket via Sumner Tunnel
- 442 Marblehead-Haymarket via Sumner Tunnel
- 450 Salem-Haymarket via Tobin Bridge
- 455 Salem-Haymarket via Sumner Tunnel
- 458 Danvers-Haymarket via Salem, Sumner Tunnel

APPENDIX H1 - STATE LEGISLATION

TO: OLIA LUPAN
BUDGET OFFICE



MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY

FROM: MICHAEL J. GREALY
ASSISTANT GENERAL COUNSEL

DATE: August 28, 1987

Greg Flynn asked me to respond to your request concerning why the MBTA must perform an Environmental Review if it increases its fare. The regulations governing the Massachusetts Environmental Policy Act specifically require the MBTA to file an Environmental Notification Form (ENF) for any systemwide fare increase cumulative over three years of 30% or more. (See, 301 CMR §11.27(2)). ENF is the first step in an environmental review.

The Urban Mass Transit Act (UMTA) also requires the MBTA to indicate in its application for federal funds whether or not the financial assistance requested will change the fare or the current level of service. (49 USC §1604(i)). UMTA further provides that financial assistance for a project may not change the fare currently charged by the grant recipient unless the recipient has given consideration to the effect of energy conservation and the economic, environmental and social impact of the change in such fare.

If you have any further questions, please contact me.

MJG:pb
cc: Gregory C. Flynn

or to any agency or instrumentality of either of them. [1966:636.] Such real property shall, unless sold to the commonwealth or any political subdivision thereof or to any agency or instrumentality of either of them, be sold to the highest bidder. [1966:636.]

(c) Any concession in or lease of property for a term of more than one year shall be awarded to the highest responsible and eligible bidder therefor unless the authority shall find that sound reasons in the public interest require otherwise.

(d) Excluding any loss suffered in the operation of commuter railroad service and the Highland Branch and Mattapan high speed services while operated and equipped with street-cars, the authority shall operate its express service so far as practicable, in such a manner that no net cost of service exclusive of debt service shall arise on account of such express service in any year. In addition the authority shall operate all its services in such manner as to produce the highest return consistent with the authority's obligations under subsection (a).

(e) No change in fares shall be effective unless submitted to the advisory board and approved by it, except that changes in fares required in order to satisfy the provisions of the first sentence of subsection (d) shall be reported to, but need not be approved by, the advisory board.

11.26: continued

- (12) Department of Community Affairs.
- (a) Approval of M.G.L. c. 121A non-residential projects with total project cost of \$10 million or more.
 - (b) Approval of M.G.L. c. 121A residential projects of 100 or more new residential units (which may include up to 10,000 s.f. ancillary commercial space).
 - (c) Approval of urban renewal plans or urban revitalization and development projects under M.G.L. c. 121B, or of any major plan changes in urban renewal plans.
- (13) Boston Redevelopment Authority. Approvals by the BRA, acting as an authority, of:
- (a) Any non-residential project with total project cost (including architectural and engineering, excluding land acquisition cost or linkage payments) of \$10 million or more; or
 - (b) Residential projects of 100 or more new residential units (which may include up to 10,000 s.f. ancillary commercial space);
 - (c) New urban renewal plans or urban revitalization and development projects under M.G.L. c. 121B or any major plan changes in urban renewal plans.
- (14) Housing Appeals Committee. Decision on appeal of local order allowing 100 or more new residential units (which may include up to 10,000 s.f. ancillary commercial space).

11.27: Review Thresholds for Agency Actions and Financial Assistance.

This section identifies agency actions or projects seeking agency financial assistance which require an ENF. Note also that such action or project may require an ENF if it is categorically included (301 CMR 11.25), if it requires a permit needing an ENF (301 CMR 11.26), if it is in an ACEC (301 CMR 11.15), or if the Secretary has called for fail-safe review (301 CMR 11.03(6)).

- (1) Planning, Research, Surveying, Evaluation, and Information Gathering.
- (a) The following requires an ENF: Promulgation of regulations which lessen the stringency of existing regulations of which a primary purpose is to protect the environment.
 - (b) Otherwise, planning, design, policy development, setting of standards, promulgation of regulations, budget development, research, surveying and sampling, information gathering, evaluation, and giving of technical advice do not require an ENF.
- (2) Operations.
- (a) The following require an ENF:
 1. Massachusetts Bay Transit Authority. Systemwide fare increases, cumulative over three years, of 30% or more. Systemwide service reductions, cumulative over three years, of 20% or more.
 2. Executive Office of Transportation and Construction. Expansion of rail transportation services provided by EOTC pursuant to M.G.L. c. 161, where the resultant service exceeds an average of seven round trips per week.
 - (b) Routine operations of agencies which are not addressed by other subsections of 301 CMR 11.27, or by 301 CMR 11.26, do not require an ENF.
- (3) Maintenance, Rehabilitation, Repair, and Minor Alteration.
- (a) The following require an ENF:
 1. Massachusetts Port Authority. Any replacement, rehabilitation, or reconstruction of a runway. Any work performed on a runway which requires deactivation of a runway for more than one week.
 2. Department of Public Works, Metropolitan District Commission (roads).
 - a. On a state highway, construction of turning lanes, median alterations, lane widening, or installation of new traffic control signals to service a residential project having 50 or more dwelling

APPENDIX H2 - FEDERAL LEGISLATION

Section 9 (e)(3)(H)

this subsection, will use competitive procurements (as defined or approved by the Secretary), will not use procurements utilizing exclusionary or discriminatory specifications, and will carry out procurements in compliance with applicable Buy America provisions;

(F) has complied with the requirements of subsection (f);

(G) has available and will provide the required amount of funds in accordance with subsection (k)(1) of this section and will comply with the requirements of sections 8 and 16 of this Act; and

(H) has a locally developed process to solicit and consider public comment prior to raising fares or implementing a major reduction of transit service.

(f) Each recipient shall-

(1) make available to the public information concerning the amount of funds available under this subsection and the program that the recipient proposes to undertake with such funds;

(2) develop a proposed program of projects concerning activities to be funded in consultation with interested parties, including private transportation providers;

(3) publish a proposed program of projects in such a manner to afford affected citizens, private transportation providers, and as appropriate, local elected officials an opportunity to examine its content and to submit comments on the proposed program of projects and on the performance of the recipient; and

(4) afford an opportunity for a public hearing to obtain the views of citizens on the proposed program of projects.

In preparing the final program of projects to be submitted to the Secretary, the recipient shall consider any such comments and views, particularly those of private transportation providers, and shall, if deemed appropriate by the recipient, modify the proposed program of projects. The final program of projects shall

be made available to the public.

(a)(1) The Secretary shall, at least on an annual basis, conduct, or require the recipient to have independently conducted, reviews and audits as may be deemed necessary or appropriate by the Secretary to determine whether-

(A) the recipient has carried out its activities submitted in accordance with subsection (e)(2) in a timely and effective manner and has a continuing capacity to carry out those activities in a timely and effective manner; and

(B) the recipient has carried out those activities and its certifications and has used its Federal funds in a manner which is consistent with the applicable requirements of this Act and other applicable laws.

Audits of the use of Federal funds shall be conducted in accordance with the auditing procedures of the General Accounty Office.

(2) In addition to the reviews and audits described in paragraph (1), the Secretary shall, not less than once every three years, perform a full review and evaluation of the performance of a recipient in carrying out the recipient's program, with specific reference to compliance with statutory and administrative requirements, and consistency of actual program activities with the proposed program of projects required under subsection (e)(2) of this section and the planning process required under section 8.

(3) The Secretary may make appropriate adjustments in the amount of annual grants in accordance with the Secretary's findings under this subsection, and may reduce or withdraw such assistance or take other action as appropriate in accordance with the Secretary's review, evaluation, and audits under this subsection.

(4) No grant shall be made under this section to any recipient in any fiscal year unless the Secretary has accepted a certification for such fiscal year submitted by such person pursuant to subsection (e) of this

SUMMARY: The Urban Mass Transportation Administration is amending its rule on Public Hearing Requirements for Service Changes and Fare Changes to clarify the public hearing requirements of section 5(i)(3) of the Urban Mass Transportation Act of 1964, as amended. These requirements will no longer apply whenever the recipient of funds under the Act has certified it will comply with section 9(e)(3)(H) of the Act or where the recipient is in an area that is no longer an urbanized area.

DATE: This Notice is effective on October 10, 1986.

FOR FURTHER INFORMATION CONTACT: Jocelyn Karp, Office of Chief Counsel, (202) 366-1936.

SUPPLEMENTARY INFORMATION: The phasing out of the section 5 urban formula grant program will be completed on September 30, 1988. As recipients of Federal assistance under the Urban Mass Transportation Act of 1964, as amended, have prepared for the completion of this phaseout, questions have arisen about the continued applicability of the requirements of section 5(i)(3) of the Act. To resolve these questions, the Urban Mass Transportation Administration is clarifying the application of the requirements of section 5(i)(3) of the Act.

Legislative History

Section 5 of the Urban Mass Transportation Act of 1964, as amended (UMT Act), authorizes the Secretary of Transportation to make grants for construction of mass transportation projects or for operating assistance to mass transportation systems in urbanized areas. Funds are made available under section 5 pursuant to a legislative formula. Subsection (i) requires that the Governor or the designated recipient of funding under section 5 certify to the Secretary that he or it has conducted public hearings, or afforded the opportunity for such hearings, and that the hearings included or were scheduled to include consideration of issues specified under the subsection. The Secretary's authority under the UMT Act has been delegated to the Administrator of the Urban Mass Transportation Administration.

Paragraph (3) of subsection 5(i) was added to the UMT Act by an amendment to the Surface Transportation Assistance Act of 1978, Pub. L. 95-599. The provision requires that any section 5 applicant submit, along with its public hearing certification:

... assurances satisfactory to the Secretary that any public mass transportation system receiving financial assistance under such project will not change any fare and will not substantially change any service except (A) after having held public hearings or having afforded an adequate opportunity for such hearings, after adequate public notice, (B) after having given proper consideration to views and comments expressed in such hearings, and (C) after having given consideration to the effect on energy conservation, and the economic, environmental, and social impact of the change in such fare or such service

The provision applied to any "mass transit system funded under section 5 of the UMT Act for which a general fare increase or substantial change in service [was] made after [the effective date of the legislation]." 44 FR 41272 (July 16, 1979). It applied to any recipient of section 5 assistance, capital or operating. 45 FR 26298 (April 17, 1980).

In its reauthorizing proposals in 1981 and 1982, the Administration proposed to amend section 5(i)(3) to read as follows:

(3) Assurances satisfactory to the Secretary that any public mass transportation system receiving operating assistance under this section has a locally developed process to solicit and consider public comment prior to raising fares or reducing transit service.

This amendment would have continued the requirement of a public comment process, but that public comment process could have been locally determined. The amended section would only have been a condition of assistance for operating assistance grants. Neither the Administration's 1981 nor its 1982 authorizing proposal was accepted.

The core of the Administration's proposed fare and service change provision, without its limitation to operating assistance, was included in the conference agreement on the Surface Transportation Assistance Act of 1982 as part of the new section 9 urban formula assistance program. Thus, section 9(e)(3)(H) of the UMT Act requires that a recipient, as a condition of receiving funds under section 9, certify that it "has a locally developed process to solicit and consider public comment prior to raising fares or implementing a major reduction of transit service."

Discussion of Applicability of Section 5(i)(3)

The original intent of section 5(i)(3) was that by accepting section 5 funds, the recipient promised to abide by section 5(i)(3) in the future. The enactment of the section 9 program militates against the continued application of section 5(i)(3)

requirements as originally intended. It is clear from the legislative history that section 9 was intended to supersede section 5. Moreover, the legislative history of section 9(e)(3)(H), which specifically relates to public comment on fare and service changes, establishes that this provision is the successor to section 5(i)(3). In other words, the requirements of section 9(e)(3)(H) were intended to take the place of the section 5(i)(3) requirements.

Therefore, once a recipient has certified that it will meet the requirements of section 9(e)(3)(H), it need not meet the requirements of section 5(i)(3). Otherwise, the section 5 fare and service change requirements would conflict with those of section 9. It should be noted that since section 9(e)(3)(H) allows the recipient to develop a process locally to receive and consider comments on fare changes and major service reductions, a recipient is free to hold hearings as contemplated by section 5(i)(3) should it choose to do so.

Because section 5(i)(3) applied to the urban formula grant program, it would be extending the reach of the provision and would be inconsistent with section 18, which authorizes the nonurbanized area formula assistance program, to apply the section 5(i)(3) requirements to a recipient that is in an area that no longer is an urbanized area. Therefore, where the recipient received section 5 funds after the enactment of section 5(i)(3), but is in an area that no longer is an urbanized area (and thus has not made the section 9 certification), the section 5(i)(3) requirements do not apply.

Notice and Comment

This amendment is interpretative; it merely clarifies the application of section 5(i)(3) to the UMTA grant program. Under section 553(b) of the Administrative Procedure Act, notice and comment are not necessary.

Effective Date

As noted above, before the enactment of the Surface Transportation Assistance Act of 1982, certification under section 5(i)(3) was interpreted as a promise to comply with those hearing requirements during the life of the project. However, the 5(i)(3) hearing requirements are different from those of section 9(e)(3)(H), the section that superseded section 5(i)(3). It is imperative that recipients be clear on which hearing requirements they must follow for fare and service changes. This amendment will clarify when recipients are no longer required to follow section 5(i)(3) requirements. Therefore, there is

good cause under section 553(d) of the Administrative Procedure Act to make this amendment effective immediately upon publication.

Regulatory Impacts

The Administrator of UMTA has determined that this amendment does not constitute a major rule as defined by Executive Order 12291, nor is it a significant rulemaking action under the Department of Transportation regulatory policies and procedures.

Paperwork Reduction Act

The amendment does not impose any information collection requirements beyond those already in place for section 9. The section 9 information collection requirements have already been approved (OMB control number 2132-0502) under the Paperwork Reduction Act (Pub. L. 96-511, 94 Stat. 2812). Therefore, this amendment is not subject to section 2(a) of the Paperwork Reduction Act.

List of Subjects in 49 CFR Part 635

Grant programs—transportation.
Public hearings. Mass transportation.

PART 49—[AMENDED]

In consideration of the foregoing, Chapter VI of Title 49, Code of Federal Regulations, is amended as follows:

1. The authority citation for Part 635 continues to read as follows:

Authority: 49 U.S.C. 1604(i)(3); sec. 5(i)(3) of the Mass Transportation Act of 1964, as amended; 49 CFR 1.51.

2. Section 635.3 is amended by revising paragraph (c) to read as follows:

§ 635.3 Assurances.

• • • • •

(c) Each recipient must abide by the terms and conditions stated in the assurance, until the recipient either submits a certification under section 9(e)(3)(H) of the Act or is in an area that no longer is an urbanized area.

(Catalog of Federal Domestic Assistance Program Numbers: 20.507, Urban Mass Transportation Capital and Operating Assistance Formula Grants; 20.509, Public Transportation for Rural and Small Urban Areas).

Issued on: October 3, 1986.

Ralph L. Stanley,

Administrator.

[FR Doc. 86-22785 Filed 10-9-86; 8:45 am]

BILLING CODE 4910-67-01

§ 635.1

AUTHORITY: 49 U.S.C. 1604(i)(3) (sec. 5(i)(3) of the Urban Mass Transportation Act of 1964 as amended); 49 CFR 1.51.

SOURCE: 45 FR 26300, Apr. 17, 1980, unless otherwise noted.

Subpart A—Public Hearing Requirements for Fare Changes and Substantial Service Changes

§ 635.1 Purpose.

(a) Section 5(i)(3) of the Urban Mass Transportation Act of 1964, as amended (hereinafter referred to as the Act), requires that recipients of section 5 funds must make "assurances satisfactory to the Secretary that any public mass transportation system receiving financial assistance under such project will not change any fare and will not substantially change any service except: (1) After having held public hearings or having afforded an adequate opportunity for such hearings, after adequate public notice, (2) after having given proper consideration to views and comments expressed in such hearings, and (3) after having given consideration to the effect on energy conservation, and the economic, environmental, and social impact of the change in such fare or such service."

(b) This subpart sets out the regulations implementing the statutory requirement that a public hearing be held for changes in fares and substantial changes in service.

§ 635.2 Definitions.

As used in this subpart:

(a) Recipient means a Governor or entity designated as a recipient under section 5(b) of the Urban Mass Transportation Act of 1964, as amended. The recipient undertakes the legal responsibility for carrying out section 5 projects directly by lease, by contract, or otherwise.

(b) A transit route is a route over which a transit vehicle travels which is specifically labelled or numbered for the purpose of picking up or discharging passengers at regularly scheduled stops and intervals.

(c) A transit route mile is a distance of one statute mile along a route regularly travelled by transit vehicles while available for the general public to carry passengers. The length of a

49 CFR Ch. VI (10-1-86 Edition)

route is the round trip distance traversed in traveling completely over the route and returning to the starting point to begin another circuit of the route. If a route is only defined in one direction, then this one-directional distance is the route length.

(d) A transit revenue vehicle mile is a distance of one statute mile travelled while a transit vehicle is available to the general public to carry passengers.

(e) Ridership means the number of unlinked revenue passenger trips carried. An unlinked passenger trip does not include any transfers. (A single trip by a transit user involving three vehicles and using two transfers is three unlinked passenger trips.)

(f) A service change is any addition or deletion resulting in the physical realignment of a transit route, or a change in the type or frequency of service provided in a specific, regularly scheduled transit route.

(g) Experimental service change is an addition of service to an existing transit route, or the establishment of a new transit route.

§ 635.3 Assurances.

(a) Each recipient of section 5 funds must execute and submit the assurance in Appendix A of this subpart. This assurance must be executed and submitted even though the recipient has previously submitted an assurance prior to May 17, 1980. The new assurance will replace any previously submitted assurance.

(b) The assurance may be incorporated in the one-time submission of standard assurances required under UMTA Circular C 9050.1 (section 5 operating grants) or UMTA Circular C 9100.1 (section 5 capital grants).

(c) Each recipient must abide by the terms and conditions stated in the assurance.

§ 635.7 When hearing is required.

(a) Except as provided elsewhere in this section, a hearing required by section 5(i)(3) of the Act must be held when:

(1) There is a change in any fare;

(2) There is any change in service of:

(i) 25 percent or more of the number of transit route miles of a route; or

DEPARTMENT OF TRANSPORTATION

Office of the Secretary

49 CFR Part 27

[Docket No. 56b; Amdt. No. 27-3]

Nondiscrimination on the Basis of Handicap in the Department of Transportation Financial Assistance Programs

AGENCY: Office of the Secretary, DOT.
ACTION: Final rule.

SUMMARY: This final rule requires recipients of financial assistance from the Department of Transportation for urban mass transportation to establish programs to provide transit services to handicapped persons. The service must meet certain service criteria. The rule also establishes a limit on the amount of money a recipient must spend to meet these criteria. The rule carries out section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and section 317(c) of the Surface Transportation Assistance Act of 1982 (49 U.S.C. 1612(d)), as they apply to the Department's financial assistance program for urban mass transportation. In an accompanying notice of proposed rulemaking, the Department is proposing provisions concerning commuter rail systems and certain other matters.

EFFECTIVE DATE: This final rule is effective June 23, 1986.

FOR FURTHER INFORMATION CONTACT: Robert C. Ashby, Deputy Assistant General Counsel for Regulations and Enforcement, U.S. Department of Transportation, Room 10424, 400 7th Street, SW., Washington, DC 20590; (202) 426-4723 (voice) or (202) 755-7687 (TDD). The Department is currently in the process of installing a new telephone system. As a result, the voice information number is expected to change, during July 1986, to (202) 366-9305. The TDD number is not expected to change. This rule has been taped for use by visually-impaired persons.

Requests for taped copies of the rule should be made to Mr. Ashby.

SUPPLEMENTARY INFORMATION:**Highlights of the Rule**

This final rule creates a new Subpart E of 49 CFR Part 27, Department's rule on nondiscrimination on the basis of handicap in financial assistance programs. The rule carries out section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and section 317(c) of the Surface Transportation Assistance Act of 1982 (49 U.S.C. 1612(d)), as they apply to the Department's financial assistance

program for urban mass transportation. The new Subpart E replaces the present § 27.77, which originated in a July 1981 interim final rule.

With a few exceptions, the new rule requires each recipient of financial assistance from the Urban Mass Transportation Administration (UMTA) to prepare a program for providing transportation services to handicapped persons. The recipient must go through a public participation process, including consultation with handicapped persons. Within a year from the effective date of this rule, the recipient must transmit the program to UMTA for approval.

Recipients may fulfill their obligations under the rule by choosing either a special service (e.g., dial-a-van, taxi voucher), an accessible bus system (either a scheduled or on-call accessible bus system), or a mixed system (i.e., a system having both special service and accessible bus elements). Whatever type of service the recipient elects to provide, the service must meet the following six service criteria:

(1) All persons who, by reason of handicap, are physically unable to use the recipient's bus service for the general public must be eligible to use the service for handicapped persons;

(2) Service must be provided to a handicapped person within 24 hours of a request of it;

(3) Restrictions or priorities based on trip purpose are prohibited;

(4) Fares must be comparable to fares charged the general public for the same or a similar trip;

(5) The service for handicapped persons must operate throughout the same days and hours as the service for the general public; and

(6) The service for handicapped persons must be available throughout the same service area as the service for the general public.

The rule spells out how the six criteria apply to each kind of transportation system.

The rule establishes a limit on the amount of money a recipient is required to spend to meet these service requirements. This limit on required expenditures is calculated by taking 3.0 percent of the recipient's average operating costs over the current and two previous fiscal years.

If the recipient cannot meet the six criteria for the type of service it chooses without exceeding this limit on required expenditures, the recipient may modify its service to keep its expenditures within the limit, after consultation through its public participation process.

The rest of the rule's provisions are primarily administrative in nature. They concern such subjects as the expenses eligible to be counted in determining whether a recipient has exceeded its limit on required expenditures, UMTA monitoring of recipients' actions, special provisions for small recipients and multi-recipient regions, and technical exemption procedures.

The Department has performed a Regulatory Impact Analysis (RIA) in connection with this rule. This analysis, based on case studies of several existing systems and a computer model study of a large sample of systems, projects the annual and long-term costs and cost-effectiveness of various approaches to providing transportation service to disabled persons. A copy of the RIA has been placed in the docket for this rulemaking.

In an accompanying notice of proposed rulemaking (NPRM), the Department is proposing requirements for commuter rail systems, on which comments are being requested for 90 days. The NPRM also proposes to incorporate vehicle and fixed facility standards, as well as the reduced fare requirement for elderly and handicapped passengers, from 49 CFR Part 609, which would be withdrawn.

Background of the Rulemaking

Section 504 of the Rehabilitation Act of 1973 prohibits discrimination on the basis of handicap in federally-assisted programs. The Department's existing regulation, 49 CFR Part 27, implements this statute in the Department's mass transit programs. This 1979 regulation imposed accessibility requirements for DOT-assisted highways, airports, intercity rail service, and mass transit.

In *American Public Transit Association v. Lewis*, 556 F.2d 1271 (D.C. Cir., 1981), the U.S. Court of Appeals for the District of Columbia Circuit held that, under section 504, a transit authority might be required to take "modest, affirmative steps to accommodate handicapped persons". The Court said, however, that the 1979 regulation, as applied to mass transit, exceeded the Department's section 504 authority because it required overly costly efforts to modify existing systems.

The Department reviewed the rule and determined that its policy is that recipients of Federal assistance for mass transit must provide transportation that handicapped persons can use but that local communities have the major responsibility for deciding how this transportation should be provided.

Consistent with this policy and the Court decision, the Department issued

shall contain clearly legible sign(s) which indicate that certain seats are priority seats for elderly and handicapped persons, and which encourage other passengers to make such seats available to elderly and handicapped persons who wish to use them.

(d) *Interior handrails and stanchions.* (1) On vehicles which require use of steps in the boarding process, handrails and stanchions shall be provided in the entranceway to the vehicle in a configuration which allows elderly and handicapped persons to grasp such assists from outside the vehicle while starting to board, and to continue using such assists throughout the boarding process.

(2) On level-entry vehicles, handrails, stanchions, and seats shall be located so as to allow a wheelchair user to enter the vehicle and position the wheelchair in a location which does not obstruct the movement of other passengers.

(3) On all vehicles, handrails and stanchions shall be sufficient to permit safe boarding, on-board circulation, seating and standing assistance, and unboarding by elderly and handicapped persons.

(e) *Floor and step surfaces.* (1) All floors and steps shall have slip-resistant surfaces.

(2) Any step edges shall have a band of bright contrasting color(s) running the full width of the step.

(f) *Lighting in step-entry vehicles.* (1) Any stepwell immediately adjacent to the driver shall have, when the door is open, at least 2 footcandles of illumination measured on the step tread.

(2) Other stepwells shall have, at all times, at least 2 footcandles of illumination measured on the step tread.

(3) The vehicle doorways shall have outside lights which provide at least 1 footcandle of illumination on the street surface for a distance of 3 feet from all points on the bottom step tread edge. Such lights shall be located below window level and shielded to protect the eyes of entering and exiting passengers.

§ 609.21 Other vehicles.

Requirements for vehicles not covered by §§ 609.15, 609.17, or § 609.19

will be determined by UMTA on a case-by-case basis as part of the project approval process.

§ 609.23 Reduced fare.

Applicants for financial assistance under section 5 of the Urban Mass Transportation Act of 1964, as amended (49 U.S.C. 1604), must, as a condition to receiving such assistance, give satisfactory assurances, in such manner and form as may be required by the Urban Mass Transportation Administrator and in accordance with such terms and conditions as the Urban Mass Transportation Administrator may prescribe, that the rates charged elderly and handicapped persons during non-peak hours for transportation utilizing or involving the facilities and equipment of the project financed with assistance under this section will not exceed one-half of the rates generally applicable to other persons at peak hours, whether the operation of such facilities and equipment is by the applicant or is by another entity under lease or otherwise.

§ 609.25 Waiver.

The requirements set forth in this part may be modified or waived on a case-by-case basis upon application to the Urban Mass Transportation Administrator if the Administrator determines that such modification or waiver is clearly necessary and is consistent with the intent of the laws cited under "Authority." However, a modification or waiver of § 609.13(a) for a building covered by Pub. L. 90-480 will also require the approval of the Administrator of General Services. Any request for modification or waiver should be presented for comment at the public hearing required prior to submission of a project application to UMTA. In the event that the waiver is not presented at the hearing, the Urban Mass Transportation Administrator may require a new public hearing if he finds that the requested waiver would have a substantial effect on the accessibility of the facility or equipment to elderly and handicapped persons.

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